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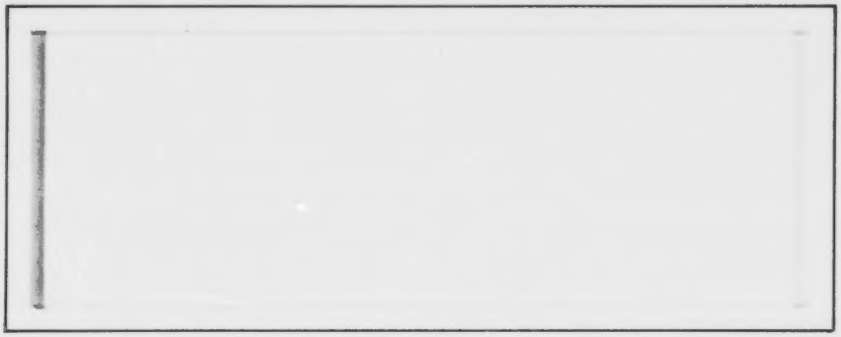

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Policy Branch

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FINANCING PRODUCTION AND SURPLUS IN THE CANADIAN EGG INDUSTRY

(Working Paper 1/88)

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June 1987

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EXECUTIVE SUMMARY

1. Two major issues concern the egg industry in 1987. The first issue is to establish a reliable source of shell egg breaking stock for the domestic processing sector in order to support the demand for Canadian processed egg products, in Canada and abroad, while retaining a cost-competitive position for Canadian processors in both the domestic and export markets. The second issue is to establish the legitimate financial responsibilities of consumers, producers and processors towards offsetting the costs of disposal of surplus shell eggs produced in the course of the routine supply of the table egg market, while continuing to assure Canadian producers of compensatory returns. The second issue may be defined specifically as the determination of the appropriate level of the consumer levy, and of the producer and processor contributions.

2. The Federal-Provincial Egg Marketing Agreement defines the context in which to address these two issues. This Agreement defines the mandate of Canadian egg producers to produce to supply the domestic egg market. This has been interpreted to imply the supply of the domestic table egg market. Furthermore, the Federal-Provincial Agreement mandates the Canadian Egg Marketing Agency to dispose of surplus shell eggs produced in the course of the routine supply of the table egg market. The supply of breaking stock to processors is derived largely from the domestic shell egg production declared surplus to the domestic table market, and to a small degree from undergrade eggs and from shell egg imports. In addition, the Agreement entrenches the use of marketing levies to offset the losses caused in the course of the sale or disposal of all surplus shell eggs produced in the course of the routine supply of the table egg market.

3. The two issues relate to the degree to which domestic egg producers are mandated to supply the shell egg requirements of the domestic table egg market. Surplus shell eggs will inevitably be produced throughout the year, in the course of the routine supply of the table egg market. Hence the proportion of domestic table egg market requirements supplied by domestic producers determines the level of production of surplus shell eggs. According to the legislation and the Agreement, the pricing system is legitimately responsible for financing the costs of the sale of surplus eggs produced in the course of the routine supply of the table egg market. The level of surplus egg production determines the total cost of surplus disposal, and consequently the size of the levies or contributions which must be assessed via the pricing system. The difficulty is that the Agreement does not prescribe the appropriate level of domestic shell egg production, nor the mechanisms and frontiers defining the changes in either or both table and processed egg

consumption that would initiate changes in the level of domestic shell egg production. Furthermore, the Agreement in no way prescribes a maximum limit to any levy, either on a cents per dozen or on an annual total basis.

4. This study explores the welfare implications for two principal industry sectors, consumers and producers, of alternative structures of domestic production and surplus disposal financing. Three domestic production alternatives are explored: first, production set according to the current allocation of quota; second, production set at the level of average total fourth-quarter table egg consumption, the peak quarter of the year; and third, production set at the level to drive supplementary imports of table grade shell eggs to zero in the fourth quarter. The third option represents the closest approximation to the maximum level of actual table egg consumption in the quarter of peak demand. Three alternative methods of financing the costs of surplus disposal are considered: first, assigning the entire responsibility for the costs of surplus disposal to the consumer levy; second, assigning the entire responsibility for surplus disposal financing to producers; and third, assigning the consumer levy the responsibility to finance surplus sales to the domestic market, and producers the responsibility to finance surplus sales to the export markets.

5. The results of the study demonstrate that the current level of the consumer levy, 3.5 cents/dozen, is likely to be sufficient to offset the costs of surplus disposal on the domestic market over the five-year planning horizon of this study: 1987 - 1991. The increase in the consumer levy required to offset the sales of all surplus shell eggs, to both the domestic and export markets, is forecast to be just slightly greater than the sum of the current producer and processor contributions. An increase in domestic shell egg production to the level required to drive fourth-quarter supplemental imports to zero is forecast to require an annual average increase in the consumer levy of just over one cent per dozen. A reduction in domestic shell egg production to the level of total fourth-quarter table egg consumption is forecast to cut the consumer levy by slightly more than half. Any change in the retail price of table eggs caused by a change in the consumer levy has only a negligible effect on total table egg disappearance.

6. If producers are assigned the responsibility to finance the entire costs of surplus disposal, the producer contribution is expected to rise by roughly the sum of the current processor contribution and the current consumer levy.

7. Import requirements of shell and processed eggs are forecast to grow by roughly 300 thousand boxes of 15 dozen per year over the five-year planning horizon, in order to support the forecast needs of domestic processors to supply both the domestic and export processed egg markets. Domestic production set at the level to drive fourth-quarter

supplementary imports of table eggs to zero, would be expected to increase average annual surplus shell egg production by roughly 20%, and to reduce average annual import requirements for shell and processed eggs by over 40%. This reduction in import requirements will reduce the increase required in shell and processed egg imports by roughly half by 1991, and by considerably more in the earlier years. In contrast, domestic production set at total fourth-quarter table egg demand would be expected to cut average annual surplus production by 15%-30%, and to increase import requirements of shell and processed eggs by 41%-47%.

I. INTRODUCTION

The egg industry operates under supply management. A central national authority governs production and price directly at the farm and processing levels, and influences prices at subsequent levels in the agri-food chain. However, supply management is by no means a polished and fully-developed institution. The guiding principles and procedures of supply management in the egg industry are defined by complementary federal and provincial enabling legislation and by a binding federal-provincial agreement. These principles and procedures are not comprehensive. One gap in the legislation is particularly outstanding in the context of the current situation of the egg industry. Neither the legislation nor the Federal-Provincial Agreement clearly identify the target market or markets, nor the target level of shell egg production, for the egg producers involved under supply management.

At least two current issues depend on the resolution of this ambiguity in the legislation. The first issue is the identification of the source of supply of breaking stock to support the growth of the domestic processing sector. The second is the delimitation of the legitimate financial responsibilities of the three sectors of the industry (consumers, processors and producers) towards offsetting the costs of the disposal of surplus shell eggs.

This paper is concerned with exploring the current difficulties in the conceptualization and implementation of supply management as it operates in the egg industry, and the implications for the resolution of the two current issues in the industry. The study proposes policy alternatives to address the lack of specificity in the Agreement, and evaluates the corresponding welfare implications for consumers and producers in terms of the two outstanding issues.

The methodology is applied welfare analysis: the determination of the financial and volume implications for each of the three sectors of the industry of alternative structural adjustments in the industry. These adjustments must accommodate the legitimate requirements of the three sectors, without jeopardizing the explicit statement or the implicit spirit of the enabling legislation or the Federal-Provincial Agreement. This study makes no effort to consider alternatives that are not clearly supported by the enabling legislation and the Agreement.

This study proceeds as follows: Chapter II describes the structure of supply management in the egg industry, and then explores the current

legislative difficulties and the policy issues. Chapter II includes a discussion of the general policy principles that guide the selection of the structural alternatives in this study. In particular, this study examines the fundamental principles that bear on the specification of domestic production, and on the allocation of the costs of surplus disposal among the three industry sectors. Chapter III develops the methodology of the study: the applied welfare analysis of the egg industry. The chapter begins with a review of the relevant work done to date in evaluating supply management, including the justification of the methodology adopted in this study. Chapter III follows with both a discussion and a graphic analysis of the industry structure, and an outline of the econometric model used in the study.

Chapter IV explores the dynamics of the industry: the trends and outlook in production and processing, consumption, and pricing, and the implications of these trends in defining the feasible options for the industry. The chapter also examines alternative market scenarios likely to govern developments in the industry, including forecasts of US and Canadian prices and of Canadian processed and table egg demand, for each year of the five-year planning horizon. Chapters III and IV may be skipped by the reader already familiar with the industry and impatient with the technical details of the analysis, who is only interested in the policy alternatives and the results.

Chapter V develops the alternative structures of supply and financing in the egg industry to be considered in this study. The results of the study are examined in Chapter VI, and Chapter VII concludes with a discussion of the policy implications of the results. An appendix presents the important clauses of the enabling legislation and the Federal-Provincial Agreement.

II. ISSUES AND OBJECTIVES

1. The Supply and Disposition of Eggs in Canada

a. table eggs

To begin, the issues concerning the industry must be placed within the context of the current structure of the industry. The egg industry is regulated according to a system of supply management. Production and pricing in the industry are managed by a marketing board, the Canadian Egg Marketing Agency (CEMA). Hiscocks (1972) defines a marketing board as a "compulsory horizontal marketing organization for primary or processed natural products operating under government-delegated authority". Supervision and recourse is vested in the National Farm Products Marketing Council (NFPMC) (1). The Agency establishes the maximum permissable level of domestic commercial shell egg production, currently expressed in terms of permissable provincial quotas of layer numbers. Roughly 10% - 15% of domestic shell egg production is comprised of hatching egg production, plus non-commercial production of table eggs usually sold outside the commercial distribution system. The remainder is commercial production of table eggs, graded at commercial grading stations; this production is the subject of this study.

The enabling legislation (Appendix A) directed that shell egg production at the time of the formation of the Agency be set at a level corresponding to the average level of production in the five years immediately preceding the Proclamation of the Agency. The enabling legislation and the Federal-Provincial Agreement also stated that changes in the level of production were to follow observed changes in the size of the egg market. CEMA has interpreted Section 22 of the Act and the introduction to the Proclamation to mean that its responsibility is to supply the table egg market, with no obligation to satisfy total Canadian egg consumption requirements, which would include the supply of the processed egg market. Since the formation of the Agency in 1973, the level of permissable production as measured by layer numbers has been revised periodically, usually downward to reflect little or no market growth and increased layer productivity. National layer quota has not been changed since 1983 when it was revised downward by five percent.

b. surplus eggs

Surplus eggs are those residual Canada Grade A shell egg stocks remaining unsold by private dealers at the end of each week after provincial table egg markets are supplied from provincial shell egg production. Some quantity of surplus shell egg production is an inevitable feature of any system of supply management for the fresh table egg market, regardless of the size of the national flock. That is, some quantity of surplus shell eggs will inevitably be produced in the course of the routine supply of the table egg market.

The reaons for the inevitable production of surplus shell eggs are as follows. First, since domestic table egg demand displays considerable seasonal variation, in contrast to almost negligible seasonal variation in shell egg production from the fixed flock, some varying quantities of surplus shell eggs will be generated through most of the year. Then assuming total annual national production is set exactly equal to total annual national shell egg consumption, in the remainder of the year (chiefly the Easter and Christmas periods) some level of shell egg imports would be required, to satisfy the current requirements of the table egg market.

Second, since the table egg market is a fresh product market, operating on a one-to-two-week time-frame, and greatly affected by retail featuring, some level of surplus production would arise irrespective of the frequency with which total national production was revised to match total national consumption. That is, in any week the annualized rate of national table egg consumption may be greater than, less than, or just equal to domestic production, since the annualized rate of national table egg consumption is so variable. The annualized rate of national table egg consumption is defined as the volume of table eggs that would be consumed in one year, if the volume of table egg consumption in the given week continued for 52 weeks. It is precisely this continual change in the weekly annualized rates of table egg production and consumption that generates surplus (or less frequently import requirements).

Third, the production of eggs from a layer hen varies through her laying cycle from the smaller to the larger grades, and at times includes low quality cracks produced by handling faults. Since the table egg market is predominantly an A Large and an A Extra-large market, surplus eggs of the smaller (and of low-quality) grades will always be produced. And finally, surplus eggs are produced for a reason distinctly Canadian: since total quota is set nationally, while provincial quota is set according to the provincial shares of the national market in the five-year period preceding the formation of the Agency, provincial table egg requirements do not necessarily correspond to provincial table egg production in any province. The current disparities in provincial production levels and consumption requirements have increased the need for interprovincial movement to satisfy regional domestic table egg

markets.

According to the enabling federal-provincial agreement (Appendix A), CEMA is responsible for the disposal of all Canada Grade A shell eggs produced domestically that are declared surplus to table market requirements. Residual shell egg stocks remaining after domestic table egg consumption is supplied are largely sold to domestic and foreign processors (or breakers). A very small percentage are shipped interprovincially to deficit table markets by the national Agency itself. Finally, the lower-quality eggs (grades B and C) are sold directly to domestic processors by the egg graders, without any intercession by the Agency.

2. Pricing

a. table egg pricing

All domestic commercial shell egg production in Canada is priced by a formula. The formula is updated by CEMA at regularly scheduled intervals. The formula was the subject of public hearings in 1976 and of a Commission of Inquiry in 1982. As directed by the federal-provincial agreement (Appendix A), the formula sets the price of grade A Large (AL) eggs at a level which will compensate average producers for their cost of production (COP) plus a reasonable rate of return. Hence the formula price is referred to as the "compensatory" price.

More precisely, the formula sets the price of AL eggs in Ontario equal to the sum of the national weighted average costs of all production inputs, plus certain fees to offset administrative and other costs incurred by CEMA. In terms of a simplified version of the pricing formula, the price of grade A Large shell eggs in other provinces is then defined on the basis of the freight and handling differentials between Ontario and each of the other provinces. The prices of other grades are defined according to market considerations and joint agreement between CEMA and each of the provinces. Surplus shell eggs sold interprovincially for the table egg market in provinces other than the producing province are priced at the province of destination. Hence the level of the embedded freight and handling differentials relative to the actual costs of shipment defines the rate of interprovincial movement undertaken by the trade.

b. surplus egg pricing

Surplus table-grade eggs are sold to Canadian and American processors on what is in fact a North American market. The Canadian markets for breaking stock and for processed egg products are effectively North

American markets, principally for two reasons. First, import quotas for processed egg products are generous enough to permit relatively free flows of product northwards, at the US price plus tariff. Second, large domestic users of egg products (such as for bakery and processed foods) can shift their manufacturing operations south of the border without too much difficulty, or can alter their mix of products or ingredients to largely or completely exclude egg derivatives. Hence Canadian breaking stock prices must remain competitive with prices of US eggs for breaking, to avoid arbitrage movement or restricted use of Canadian processed egg products.

In consequence, the only price at which CEMA can sell surplus eggs to domestic and US processors is set on the North American market, and in practice, this price is a US price. This situation is similar to that in the red meat industries, in which the US price largely determines the Canadian price. CEMA sells surplus table-grade eggs to processors for use in two markets, the domestic market and the foreign market. Surplus table-grade eggs sold to domestic processors for domestic consumption is priced at the Canadian equivalent of the landed cost of US breaking stock. Specifically, the price of surplus eggs sold for the domestic processed egg market is determined according to a formula. The formula is based on the price of US breaking stock. To this price the formula adds the costs of transportation and handling from the US, the tariff, and a processor levy (see Chapter III for details). Surplus table-grade eggs sold for foreign markets for processed eggs are tendered for bids from domestic and foreign processors. Only American processors have submitted bids to CEMA for these eggs over the history of the system. The bids are normally priced below the formula price at which CEMA sells surplus table-grade eggs for the domestic processed egg market. The lower price compensates processors for the costs of shipment overseas and for difficulties associated with supply uncertainty and sporadic deliveries, and reflects the price prevailing on international markets.

It has been suggested that the principle of sales to domestic processors for the domestic processed egg market at the North American cost-competitive price ought to be replaced by the principle of "user-pays", or "full-cost" pricing. This principle implies that the sales price of domestically-produced shell eggs ought to be fixed at the compensatory level, regardless of the market of destination. The implementation of this principle would either force the domestic processing sector into ruinous competition with much lower-priced US product, or require the Canadian government to extend import controls to manufactured products containing smaller proportions of egg ingredients, almost inconceivable in the current trade environment.

In its recent white paper "Policy for Growth", CEMA suggested a differential (or segmented) levy system on end-products designed to partly implement a full-cost pricing system. In the first instance, all Grade A eggs sold to the "quasi-egg" sector (all eggs processed other than by breaking, such as by boiling and pickling) would gradually be

brought to full-cost pricing over a short number of years. In the second instance, full-cost pricing would be assessed against broken eggs delivered by breakers to the Hotel, Restaurant, and Institutional (HRI) trade. This policy is based on the understanding that these end-users can afford to pay the full (compensatory) cost for their processed egg inputs. In contrast, sales of processed egg product to larger food manufacturers would be exempted from full-cost pricing. The proportion of sales to HRI end-users from each breaker would be determined by annual audit of the graders' books. This system may be expected to be difficult to administer.

3. Levies

a. origins

The disposition of weekly surplus table eggs imposes considerable costs on CEMA, which buys all surplus table-grade shell eggs from commercial grading stations at the compensatory price, and sells almost all surplus eggs to Canadian and American processors at North American-competitive breaker prices. These prices are lower than the compensatory price for table market eggs. The cost of surplus disposal is equal to the difference between the compensatory price and the breaker price of the surplus eggs, plus various administrative and shipment costs (see Chapter III for greater detail).

In order to partly offset the pricing shortfall generated by sales of surplus table-grade eggs at a price lower than the compensatory price, CEMA includes a small fee in the cost-of-production formula. This fee is known as a "levy". The levy is paid by all agents marketing commercial shell eggs, who may or may not pass it on to consumers. Hence the levy is referred to as the "consumer levy". In addition, domestic processors currently contribute a small sum on every dozen eggs bought for sale to the domestic market, and producers contribute a portion of their compensatory returns. The producer contribution has been approximately equal to the "consumer levy". These three sources of financing are set at levels to jointly offset the costs of surplus disposal.

The authority vested in the Agency to assess levies derives directly from the enabling legislation (see Appendix A for the relevant clauses). The Farm Products Marketing Agencies Act states that levies are intended to generate the financial resources to permit the Agency to carry out the normal business of supply management. As noted above, this business has been defined to include surplus disposal (Appendix A). The Supreme Court of Canada, in the landmark 1976 Egg Reference Case, ruled that the levies were constitutional and did not constitute taxation. However, the enabling legislation places ultimate authority to set the level of

the levies under the auspices of the National Farm Products Marketing Council. The Agency must submit all proposed levies to Council for approval.

In short, the legislation entrenches the legitimacy of CEMA levies to offset the costs of surplus disposal on all eggs produced in the course of the routine supply of the table egg market. This defines the legitimate financial responsibility of consumers: according to the legislation, to offset the costs of sales of all surplus eggs produced in the course of the routine supply of the table egg market. In fact, the "consumer" levy serves two purposes: first, it supports the disposal of the bulk of the surplus shell eggs generated in the course of the routine supply of the table egg market; and second, in keeping with subsection a of Section 22 of the Act, it serves the public interest in supporting the existence of a viable domestic egg processing industry, to supply the domestic market.

As described above, these costs of surplus disposal are generated for four reasons, having to do among other things with the different patterns of biological production and market demand, both seasonally and by product type. In ordinary practice, these costs would be embedded in the pricing of any product. For example, the costs of disposal of slag are embedded in the price of steel. The legislative mandate of the Canadian Egg Marketing Agency to set the levy appears to implicitly derive from this standard business operating procedure. In fact, one recommendation of the 1982 fact-finding commission of the NFPMC is that the term "consumer levy" is a misnomer, and that a more appropriate term for disposal cost financing is "domestic processing levy".

b. setting the levies

The funding of surplus disposal is allocated through two CEMA accounts, the "consumer" account and the "producer" account. By convention and agreement, the consumer account is only responsible for the costs of surplus eggs sold to domestic processors for the domestic market. The consumer levy and the processor contribution are both paid into the consumer account. The producer account is only responsible for the pricing shortfall on sales of surplus table-grade eggs to foreign processors, and to domestic processors for the export market.

Historically, CEMA has adjusted the three levies to levels that would jointly generate adequate funds to offset the pricing shortfall on all sales of surplus shell eggs. For the consumer levy, the procedure has been to compare the level of funds in the consumer account to fixed perimeters to determine the need for adjustment. In other words, as the level of funds would rise or fall above or below certain indicator levels, the consumer levy would be either increased or decreased. The consumer account has been allowed to fluctuate within a range of $1.5 - 5.0 million dollars.

Currently the rates of surplus financing are fixed as follows: marketing agents are assessed 3.5 cents on each dozen purchased (the "consumer levy"), processors contribute 1.0 cent on each dozen purchased for the domestic market, and producers contribute 2.0 cents on each dozen sold. One-half cent of the producer contribution and the entire processor payment are paid into a special growth fund to cover the costs of surplus disposal in excess of 41500 boxes per week. The producer contribution of one-half cent to that fund is scheduled to fall in equal decrements of one-twelfth cent over each of the coming five years, with an initial drop of one-twelfth cent scheduled for the fourteenth week of 1987, so that the producer contribution to the growth fund will be reduced to zero by the end of the planning horizon. The processor contribution is scheduled to increase over these five years, to whatever level is necessary to offset the costs of disposal of all surplus shell eggs produced over an average 41500 boxes per week.

The NFPMC has limited the consumer levy to 3.5 cents per dozen since early 1986, and for the duration of 1987. This is the size of levy estimated to be sufficient to offset all sales of surplus eggs to domestic processors that are targeted towards the domestic market for processed eggs. The restriction of consumer financial support to offsetting the deficit on surplus eggs sold for the domestic processed egg market was agreed to in 1982 between CEMA and Council. At the time, exports of shell eggs and processed eggs products were assumed to be a priori testimony of excessive domestic production. This excessive production was assumed to result from poor planning of quota allocations relative to domestic table egg requirements.

c. international implications

The sales of surplus table-grade shell eggs below cost (the compensatory price) to Canadian and American processors does not in any way constitute subsidization, nor does it deviate from the guidelines for national supply management programs as defined by GATT. This is so for three reasons. First, the sale of surplus table-grade eggs at prices below the compensatory price to domestic processors for sale on the domestic market does not constitute subsidization of processor input costs, since these eggs are sold at a price set by formula to equal the landed cost of competitive product from the United States. The price of this competitive product is defined on what is essentially a North American market, and is set by CEMA in order to compete with the alternative US breaking stock and processed egg product available to domestic processors and to users of egg products.

Neither does the sale of surplus table-grade eggs to domestic processors at prices below the compensatory price for sale on the export market constitute subsidization of exports of processed eggs. The reason is that these surplus eggs are offered on international tender, and the

highest net bids from US and Canadian processors buy the raw product. The producer contribution merely offsets the losses to the national egg Agency, regardless of the nationality of the processor purchasing the surplus table-grade eggs. Third and finally, the consumer levy cannot be construed as a subsidy to producers for the disposal of surplus table-grade eggs below cost. In fact, it represents only a normal addition to the price of sale, to offset the costs of disposal of surplus product generated in the routine course of supply of the principal producer market.

4. The Legislative Problem

The fundamental objective of supply management is to preserve the family farm structure of the Canadian egg industry. The fundamental principle of supply management is to assure a broad-based community of egg producers their cost of production plus a reasonable rate of return. The fundamental procedure of supply management is to set domestic production at that level which, in addition to the formula-set level of authorized imports, will generate a supply that will satisfy the domestic table egg market at a price that will just compensate the average egg producer for his or her costs of production plus a reasonable rate of return (the "compensatory" price) (2). The fundamental problem of supply management in the egg industry is to dispose of the surplus production that inevitably occurs, for all of the four reasons described above (3).

To reiterate, in the egg industry compensated production has been restricted to the amount that has been required to satisfy the table egg market. CEMA sells surplus table-grade eggs almost entirely at considerably lower prices to the domestic and foreign processing markets. The pricing deficit incurred in the disposal of surplus table eggs is the cost of surplus disposal.

Surplus disposal costs are partly incurred because domestic producers are assigned a level of production in excess of the minimum weekly level of table egg demand. Any level of domestic shell egg production in excess of the minimum weekly level of table egg demand will generate surplus shell egg supplies through some part of the remainder of the year. To the increasing degree that domestic producers are assigned the responsibility to satisfy the peaks of domestic table egg demand, they will also produce an increasing quantity of surplus shell eggs through the a greater part of the remainder of the year. Correspondingly, greater levels of deficit financing will be required to offset surplus disposal costs, as domestic producers are assigned greater responsibility to satisfy year-round table egg demand.

A critical consideration is that the legislation does not define the

criteria to use to establish the size of the table egg market. Hence the legislation does not specify the maximum level of domestic shell egg production that can legitimately be construed to be produced in the routine supply of the table egg market. The legislation merely established production at the formation of the Agency in terms of the average level of production in the five years preceding the formation of the Agency, with subsequent adjustments to be made on the basis of changes in egg consumption. Furthermore, nowhere in the legislation are guidelines established defining the mechanisms and frontiers for defining the changes in table or total egg consumption that would initiate changes in production quota and domestic production.

Consequently the legislation fails to specify the maximum level of surplus shell egg production that could legitimately be construed to be produced in the course of the routine supply of the table egg market. This maximum level of routine surplus production could then legitimately be construed to require consumer financial support to offset the costs of its disposal, or at least of that portion disposed of on the domestic processed egg market.

Hence one important challenge addressed by this study is to develop alternate definitions of the size of the domestic table egg market, and alternate criteria of establishing the level of domestic shell egg production. These will then be applied in evaluating the welfare implications of alternate structures of domestic shell egg supplies, including different combinations of domestic production and shell egg imports. The domestic shell egg production alternatives will be specified in Chapter V in terms of three methods of defining an appropriate level of domestic shell egg production relative to domestic table egg consumption.

Finally, to the degree that processors' increasing requirements for shell eggs for breaking are not met from domestic production, it is incumbent on the regulatory authorities to authorize greater levels of US shell and/or processed egg imports to support the processing sector, or alternatively, to develop a system whereby extra production quota could be distributed for lower-priced eggs (known as "b-quota") among the more efficient domestic producers. Hence, under each set of conditions, the deficit in the shell egg requirements of the table and processed egg sectors unfilled by domestic production will be filled by US imports. The level of US shell and processed egg imports for breaking will provide an indicator of the opportunity for growth facing domestic producers, at the landed US price.

5. The Current Issues

a. issue one: the breaking stock requirements of the processing sector

The ambiguity of the legislation with respect to the appropriate level of domestic shell egg production has meant that two pressing issues are unresolved after several years of attention from the industry. The first issue lies in the satisfaction of the shell egg input requirements of the processing sector. Until recently, the residual supply of eggs generated in the course of the routine operation of the egg industry was adequate to satisfy the requirements of domestic processors for breaking stock. However, the processing sector is experiencing growth in both domestic and export demand. The requirements of the processing sector now appear to be outgrowing the capacity of the routine operation of the domestic egg industry to fulfill them, both on a seasonal basis and in total on an annual basis. The outstanding requirement of the processing sector is for an assured supply of shell eggs for breaking, at internationally-competitive prices, for both the domestic and export markets.

The legislative mandate of domestic egg production does not guarantee either the supply or the price of breaking stock to the processing sector. However, as a recent document published by CEMA (September 1986 Board files) points out, the current expansion in the domestic and export markets for processed eggs represents an historic opportunity for growth for the Canadian egg industry. The first issue is to determine the source of the physical product to support that growth.

b. issue two: delimitation of the financial responsibilities of the three industry sectors towards the costs of surplus disposal

The second of the current issues lies in the delimitation of the financial responsibilities of the three sectors (consumers, processors and producers) towards offsetting the pricing shortfall in the disposal of surplus table eggs. The enabling legislation (Appendix A) does not specify an upper limit to any levy on a cents per dozen basis, nor to the total annual contribution of any sector to the costs of surplus disposal. However, considerable pressure has emerged in the industry to establish limits within which disposal cost funding can be assigned to any of the three sectors.

Recently, the debate has been intensified by the significant increases in the consumer levy and in the processor and producer contributions that are required to support the increasing costs of surplus disposal. The increasing costs have resulted from two developments in the egg industry. The first is increasing sales of surplus eggs to domestic egg processors, at the lower breaker price. These result from falling

domestic table egg disappearance and increasing domestic processed egg disappearance; and from an increasing proportion of domestic table egg production accounted for by the smaller A grades, sold as surplus at the compensatory price, and a decreasing proportion of undergrades, purchased directly by processors from grading stations.

More significantly, domestic consumption of processed eggs is growing as a proportion of total Canadian egg disappearance. Hence the increasing sales of surplus shell eggs to breakers places an increasing burden on the consumer levy account, which is financed largely by consumers through the table egg market. The increased domestic consumption of processed eggs includes two components: first, the replacement of table egg consumption in, for example, prepared breakfasts; and second, new consumption of processed eggs in prepared foods ranging from bakery and processed dairy products to fresh pasta. Hence the increasing sales of surplus eggs to breakers represents sales of shell eggs truly surplus to the requirements of the table egg market, which volume has been increasing in the years 1983 - 86 as consumers have reduced their direct consumption of eggs; and increasing shell egg sales from CEMA to processors also represents legitimate sales of eggs from Canadian producers to the domestic table egg market.

The consumer levy at its current level is approximately sufficient to make up the losses on all eggs currently sold to Canadian breakers for the domestic processed egg market. However, the trends suggest that ultimately the increasing relative share of total domestic egg disappearance accounted for by processed eggs will generate an increasing fiscal drain on the consumer account which will exceed the maximum funds which may be accumulated from the consumer levy. Under the current institutional structure, this will force the consumer levy account increasingly into debt.

The second development is the intermittent considerable fall in the disposal price of surplus eggs to breakers, and consequently the intermittent considerable increase in the total costs of surplus disposal. The cost of surplus disposal per dozen will rise and fall as the disposal price of surplus eggs changes relative to the compensatory price of shell eggs. Total funding requirements to offset the pricing deficit will rise and fall correspondingly, and according to the allocation of funding responsibilities, so will the financial burden on consumers, processors and producers.

As described above, the disposal price of surplus eggs is directly linked to the US price of eggs. The US price has frequently remained quite low in recent years, sometimes at levels so low the price is even below the US cost of production. As of March 1987, US egg prices are forecast to remain stable through the remainder of the eighties, as US egg producers adopt greater market discipline in contrast to the large cyclical swings of earlier years. Alternatively, US prices may fall, due to ample supplies fostered by still falling feed grain costs and the

failure of either the marketing order proposal (3) or voluntary discipline. The low feed grain costs are likely to have a more volatile impact on the US price of eggs than on the Canadian, since the Canadian price of eggs is altered only on a regular schedule and is set according to the cost-of-production formula which includes other, rising, costs such as labour. These two developments singly and jointly generate increasing costs of surplus disposal, and consequently greater requirements for financing.

The initiative to establish some maximum limit to the consumer levy proceeds within the context of Section 22 of the Farm Products Marketing Agencies Act, which specifies the dual objectives of any federal marketing agency assigned supply management responsibilities (Appendix A). The second objective (subsection b of Section 22) establishes the simple obligation of the regulated industry to respect the interests of both producers and consumers. The interests of consumers may be summarized in terms of criteria of equity and of efficiency. Criteria of equity are concerned with the appropriate distribution of the benefits and costs of some economic initiative. Criteria of efficiency are concerned with the impact of some structural change on the effectiveness of the allocation of resources towards optimally fulfilling the demands of consumers.

As will be discussed below in Chapter III, a number of recent studies have examined the issues of equity and efficiency in the supply management industries. These issues are evaluated in terms of transfer costs and the deadweight losses of reduced allocative efficiency, respectively. The studies appear to demonstrate that, although the transfer costs are significant, supply management generates minimal costs of reduced allocative efficiency (Schmitz 1983; Van Kooten 1987). The price impact of surplus disposal financing on table egg prices and consequently on consumer purchases is only a small fraction of the impact of the system of supply management. Hence the efficiency losses resulting from alternate mechanisms of deficit financing are assuredly negligible, in that they represent only a small fraction of the already minimal costs associated with supply management in general. Consequently this study examines the equity implications of alternate policies in production and surplus disposal financing, but ignores questions of efficiency.

An early treatment of equity in economics was resolved in the Pareto principle: that any change will be advantageous if some are made better off while the welfare of others is not reduced. As Just, Hueth & Schmitz (1984) point out, this has been amended in modern welfare analysis to the "compensation principle": that any change may be considered advantageous if the winners are able to compensate the losers, without any concern as to whether the compensation will in fact take place. This study applies welfare analysis to establish an absolute measurement of the financial costs and benefits of alternate mechanisms of deficit financing to each of the sectors, and of the

changes in volumes generated by each of the sectors. The study then examines these costs and benefits in order to establish the relative financial impacts of any structural change for each sector.

The debate concerning the processing sector proceeds within the context of the first objective (subsection a) specified by Section 22 of the Act. This clause requires supply management to promote a strong, efficient and competitive production and marketing industry. Earlier in the Act, marketing is defined to include processing. The meaning of competitiveness must be understood in the context of the international market within which the processing sector operates. Competitiveness is defined to mean ensuring processors the fairest possible chance to participate to the greatest possible degree in the Canadian egg processing market. Hence the price paid by the processing sector for breaking stock or for raw processed eggs for further processing must be an internationally-competitive price, and processors must be guaranteed unlimited access to raw materials at the international price.

Any contribution paid by the processing sector in excess of the international reference price in effect amounts to an additional input cost or penalty imposed on breakers. Increased input costs render processors increasingly non-competitive in the domestic market. Any increase in the processor price will reduce the quantity of eggs they will purchase for sale to the domestic market for processed eggs, according to the sensitivity of their demand to the price they must pay. Consequently, all other things being equal, any increase in the processor price above an internationally-competitive price will lead to an erosion of the share of the domestic market supplied by domestic processors. Furthermore, at some point as the price of eggs to breakers is continually increased, an additional increase in the price of domestically-produced processed eggs relative to the US price may lead to significant loss of sales for the domestic processing industry, and significantly decreased volumes of surplus shell egg purchases by processors for domestic sales. This is expressed as a kink in the processor demand curve (see Chapter III). Hence the only relevant subject is the final price.

The danger of an increasing processor levy is that the domestic processing industry would be priced out of the domestic market. Domestic sales of processed eggs could largely fall to US suppliers, or alternatively, processed eggs will be replaced or eliminated as ingredients in product mixes. The Canadian processing industry would survive in attenuated form, largely as an outlet for surplus Canadian shell eggs towards export markets. Furthermore, the regional identity of the processing sector may be lost in a process of consolidation in the large markets of Ontario, Manitoba and British Columbia, generating increased costs of surplus shell egg disposal from the other provinces.

In conclusion, in keeping with the first objective of a supply management agency, this study will not consider any contribution from

the domestic processing sector towards offsetting the costs of surplus disposal. All surplus disposal financing will be drawn from the consumer and producer sectors.

Finally, the overall intent of the legislation is now being questioned. Some suggest that the consumer sector is not at all responsible for the costs of surplus disposal; instead, it is suggested that the costs of surplus disposal ought to be entirely borne by the producers. In fact, producers already shoulder part of the financial responsibility of the costs of surplus disposal. It may be argued that these contributions by producers reduce their net returns below the compensatory level, and that consequently the mandate contained in the Agreement is not being fulfilled.

6. Summary of the Issues

The two issues facing the industry may be summarized as follows. The first is to support the growth in demand for Canadian processed egg products, in Canada and abroad, while ensuring a price-competitive position for Canadian processors in both the domestic and export markets. The second is to continue to assure Canadian producers of compensatory returns, without exceeding the legitimate financial responsibilities of consumers towards offsetting the costs of disposal of surplus eggs produced in the course of the routine supply of the Canadian table egg market.

The issues may be considered most generally in terms of the specification of an acceptable level of surplus generation. This may be defined in terms of an acceptable level of deficit financing of the costs of surplus disposal, and/or an acceptable level of support of the breaking stock requirements of processors. Ultimately the issues can be defined in terms of the degree to which domestic egg producers are mandated to supply year-round the weekly shell egg requirements of the domestic table egg market.

The results of this study will address two key questions. The first is: to what degree will Canadian egg producers be able to support growth in the domestic processing sector for the domestic and foreign markets? The second question is: what could be the financial impact of surplus disposal financing on consumers and producers under three different production alternatives representing different assessments of table market demand, and what impact could alternative arrangements of surplus disposal financing have on the purchasing decisions of consumers under each of the supply alternatives?

This study is concerned with evaluating alternate structures of production, imports and surplus disposal financing. These alternatives

are developed below in Chapter V. They have been designed to bridge the range of feasible alternatives. The study examines the alternatives over a five-year planning horizon (1987 - 1991) using the Agriculture Canada medium-term forecast of the industry.

footnotes

(1) the National Farm Products Marketing Council (NFPMC) is the agency established by the federal government to monitor and regulate federal marketing agencies. The Chairman of the NFPMC reports directly to the Minister of Agriculture.

(2) an important distinction must be drawn between industries regulated according to the supply-management legislation (supply-managed industries) and industries in which the existence of monopoly power due to the structural characteristics of supply of one sort or another allows the active firms to arbitrarily limit supply and raise price (supply-restricting industries). In the former industries, domestic production is established at a level calculated to generate a price which will offset producer cost-of-production plus a reasonable rate of return, in accordance with the policy objectives of Parliament. In the latter, production is set at the level that will maximize the profits of the active firms. Unfortunately, in recent literature the term supply-restricting industries has been applied to industries regulated according to supply management.

(3) In contrast, in the chicken and turkey industries, domestic production is set at a level estimated to be sufficient to supply all markets (retail, processed and fast-food). Any surplus production is disposed of by reducing the wholesale and farm-gate prices of chicken or turkey. These national agencies have no control over prices. Hence in the egg industry, the balance of supply and demand at the compensatory price is ensured by adjusting the quantity available to the demand of the table market at the compensatory price; while in the chicken and turkey industries, the balance of supply and demand proceeds in the traditional manner, by adjusting price, without any absolute guarantee that the price actually realized in the marketplace will in fact generate a compensatory return as well as cover marketing costs. In consequence, chicken producers have endured lengthy periods of less-than-compensatory returns. And naturally, domestic production quota tends to be set conservatively in the chicken and turkey industries, in order to generate a market price that will yield at least a compensatory return, without imposing undue market risk on marketers.

(4) the United Egg Producers, the organization representing US egg producers, has in the past two years initiated the procedures to implement a marketing order governing eggs in the United States.

III. METHODOLOGY

1. The Evaluation of Supply Management

a. the conceptual framework

This first section of Chapter III reviews the contribution of previous studies to the methodology of applied welfare analysis in supply-managed industries, and to the estimation of the costs and benefits of supply management in the feather industries. Section two develops the current structure of the egg industry, and section three outlines the model used in this study.

Veeman (1982a) was the first to apply welfare analysis to evaluating the impacts of supply-managing marketing boards. Van Kooten and Spriggs (1984a) developed a thorough theoretical treatment of the problem. Diagrams one(a), one(b) and two(a) from their study are reproduced on pg 42 below. These diagrams illustrate the fundamental concepts of the welfare analysis of supply-managing marketing boards. It is instructive to review these concepts prior to their application in this study.

Diagrams one(a and b) and two(a) represent the short-run and long-run, respectively, corresponding to the availability of some or all resources in unlimited quantities, and the impossibility or possibility of exit and entry to the industry. The short-run welfare of producers and consumers is defined in figure one(a) by the area between the competitive equilibrium price line and the supply and demand curves, respectively; these areas are referred to as consumer and producer surplus. Applied welfare analysis defines the impact of any structural change by estimating the change in consumer and producer surplus.

Diagram one(a) illustrates that the short-run impact of reduced production is to shift the supply curve to SWSm and to increase the price to Pm. The diagram illustrates that reduced production results in two costs to society. The first is the increased payments by consumers to producers, resulting from a higher price for a product for which consumer demand is relatively insensitive to price (inelastic). The second is the cost of the lost efficiency resulting from the forced reallocation of resources away from their most rewarding use in the supply-managed feather industry to another industry of less appeal to consumers (ie. the under-utilization of resources in the industry governed by the supply-managing marketing board). These costs are

partly offset by increased returns to producers, resulting from a partial capture of the increased consumer payments.

Diagram one(a) illustrates that the transfer of funds from consumers to producers is equal to area PmXYPc, and that the net benefit to producers is equal to area (PmXVPm'-WYZ). The producer benefit is reduced below the net transfer from consumers by both lost returns on the product no longer produced (area WYZ in figure one(a)), and by the value of lost production efficiency, equal to area Pm'BCPc in figure one(b) for each identical firm, and to Pm'VYPc in figure one(a) nationally. This lost efficiency results from the movement back up the short-run average cost curve required by the imposition of a quota reducing production nationally and equivalently to each identical firm. Hence in theory there is a net loss to society given by (Pm'VYPc+WXZ).

In the long-run, illustrated in diagram two(a), the aggregate income transfer from consumers to producers is measured by area PmXYPc, while total rent to producers includes the entire area PmXWPm". The net loss in allocative efficiency (the deadweight loss) is given by area XYZ. Area WYZ is not included as a measure of deadweight loss, since in the long-run all points on the supply curve represent points at which producers are earning normal profits, and hence no economic meaning attaches to the area above the supply curve. Hence the difference between the short-run and the long-run depends on the expectation of producers' adjustment to the reduced opportunity for production, and the measure of the net costs to society.

One controversial view expressed by Faminow and Benson (1984) suggested that the increase in producer returns resulting from the increased transfers from consumers may in part or in entirety be lost, and hence result in a net cost to society. This cost would result from the fruitless expenditure of these additional resources by their beneficiaries (the producers) in assuring the entitlement and continuation of the transfer of these resources. Hence Faminow and Benson (1984), following Posner's (1975) seed article, suggest that the introduction of supply management may reduce total social welfare by the full sum of the loss in consumer welfare plus the deadweight costs of resource misallocations. This view is, of course, extremely difficult to substantiate in practice.

Finally, Schmitz (1983) points out that the conclusion that a net welfare loss to society results from the introduction of supply-managing marketing derives from traditional analysis in the context of a hypothetical free market governed by laissez-faire assumptions. To the degree that these assumptions are an inaccurate representation of the real world, the estimates of net costs are likely to be exaggerated, or worse, misleading. In fact, as Schmitz (1983) suggests, supply management may in fact generate net benefits to society by offsetting existing market distortions and redressing producer marketing weaknesses.

b. the analytical framework

Until 1987, the studies examining the welfare implications of supply-managing marketing boards proceeded in a partial equilibrium, static framework. In order to redress the weaknesses of this approach, Schmitz (1983) suggested in his review article that the following considerations be included in subsequent studies: first, a multi-market general equilibrium framework, in order to evaluate the effects of the artificially-established production level on welfare in other markets; second, a dynamic framework, to evaluate the welfare impacts on the various sectors in the (perhaps lengthy) process of adjustment towards the new equilibrium post- supply management; third, an industrial organization perspective, to evaluate the impacts of supply management in a more comprehensive manner with respect to the actual economic groups participating in the effects of the change. The general equilibrium framework provides another advantage in addition to the information on the effects of distortions in secondary industries; as Van Kooten (1987) points out, the general equilibrium framework enables the calculation of a true system of demand equations that satisfy the constraints of utility maximization. Hence the general equilibrium framework is able to accurately support welfare inferences, while the usual ad hoc statistical specification of equations practiced through the history of the evaluation of supply-managing marketing boards cannot correctly support welfare inferences.

Harling and Thompson (1985) introduced the impact of distortions in input prices in their welfare analysis of the impact of supply-managing marketing boards. Van Kooten (1987) examined and compared the results of both alternate frameworks and methods of evaluating the welfare impacts of supply-managing marketing boards. The alternate frameworks included both the partial and general equilibrium perspectives. The alternate methods included Marshallian analysis, based on Marshallian demand and supply curves, and the more sophisticated and accurate Hicksian analysis, which estimates welfare change in terms of compensating or equivalent variations, on the basis of Hicksian demand and supply curves. Finally, Van Kooten compared the results of alternate computing algorithms applied to the estimation of welfare in a partial equilibrium Hicksian framework. Van Kooten's (1987) results demonstrated a very important finding: that the single-market partial equilibrium Marshallian framework generated estimates of consumer and producer welfare changes statistically indistinguishable from the more sophisticated methods employing various different algorithms to calculate the more representative measures of welfare defined by the compensating and equivalent variations.

What emerge as the critical factors in establishing the nature and degree of the impact of supply-managing marketing boards on consumer and

producer welfare are the elasticities of demand and supply. For example, Veeman (1982a) employed the demand elasticities estimated by Hassan and Johnson (1976) in her welfare analysis of the impacts of supply-managing marketing boards in the different feather industries, but explored the implications of alternate estimates of supply elasticities. Her results suggest that a difference in the elasticity of supply of one, from 0.5 to 1.5, has no more impact on the cost per unit to consumers than one cent per dozen. Van Kooten (1987) developed a general equilibrium analysis in a multi-market framework and explored the implications of alternate estimates of the cross-price elasticities of demand between eggs, poultry and other foods products. He concluded that welfare is quite sensitive to the estimates of the cross-price elasticities of demand, and in the extreme, complementarity between broilers and other food products may lead to a net welfare increase resulting from the introduction of supply-managing marketing boards in the broiler industry.

c. the results

Schmitz (1983) and Van Kooten (1987) summarize the results of previous studies of the costs and benefits of supply-managed feather industries. Perhaps the clearest summary of the early studies is provided in Table 4 of Schmitz's (1983) article, reproduced on pg 36 below. The table presents the results of four independent studies spanning the final half of the seventies. In the egg industry, Veeman (1982a) reports a net cost of just over one million dollars in 1979; Harling and Thompson (1983) and Arcus (1981) both estimate an annual net cost of $11 million in 1975 through 1977 and in 1979, respectively; and Barichello (1982b) calculates an annual net cost of $43 million in 1980. In the much larger broiler industry, these same four studies report a range of the annual net cost to society of six to 42 million dollars. Van Kooten and Spriggs (1984a) concluded that the introduction of supply-managing marketing boards generated net costs to society of only 0.7 percent and 2.6 percent of total annual industry sales in the egg and broiler industries, respectively.

Hence Schmitz (1983) concludes: "these (supply management) programs seem to result in a redistribution of income without any significant loss in economic efficiency. Thus policy-makers might be satisfied with this outcome if the general economic welfare of producers in supply management programs was below that of the general public". In short, the results of these recent studies suggest that the policy and programs of supply management may well satisfy government objectives of enhancing producer welfare, at a cost to society that is reasonable.

2. The Industry Structure

This study proceeds with a partial equilibrium, comparative static welfare analysis. The analysis focuses on the egg industry, and calculates the changes in the areas under the demand and above the supply curves that represent the results of introducing alternative structures of supply and of surplus disposal financing. This second section develops the structure of supply and demand constituting the three principal markets of Canadian shell egg producers. The section describes the components of supply and demand in the three markets, and outlines the constraints governing pricing and levies. The discussion is illustrated with four figures attached at the end of the section.

To begin, the structure of the management of Canadian shell egg supplies in the long-run is illustrated in Figure 1. The availability of shell egg imports from the United States is unlimited at the landed US price; hence the imports curve (curve I-US) is shown to be perfectly elastic. However, both shell and processed egg imports are restricted under supply management. A specified quantity of imports from the United States are permitted entry each year under GATT regulations, according to a global import quota. Global import quota of all shell eggs plus the shell egg equivalent of all processed egg imports is equal each year to 1.705% of the previous year's domestic production of shell eggs. Any imports of shell and processed eggs in excess of global import quota must be authorized on a case-by-case basis for supplemental import permits. Total supply (curve S2) is the sum of domestic production (curve S1) plus global imports. The total supply curve S2 diverges from a linear displacement of the domestic production curve S1, since global import quota is defined as a fixed fraction of the previous year's domestic production.

The supply curves S1 and S2 represent supply under long-run equilibrium, in the usual way. Hence these curves may be construed to represent domestic production and total supply under free market conditions, and with all structural adjustments completed; or in other words, with some one-quarter to three-quarters of all current producers out of business, and the average cost curves of the representative firm considerably below the average cost curves of the representative firm under current conditions. In fact, the average cost curve of the representative firm under current conditions has been defined according to the cost-of-production (COP) formula, and the formula price is precisely designed to compensate the representative or average producer under current conditions for his or her COP plus a reasonable rate of return. In contrast, under free market conditions, the equilibrium solution defined by the intersection of the demand and long-run supply curves yields a price P3 that is below the compensatory cost of production of the average producer under current conditions, by definition, since the long-run supply curves represent a situation following the

rationalization of the production sector under free market conditions.

The table egg market price is set at the compensatory price of the current average producer (Pc), and CEMA restricts production by quota allocation to Qc. The price is lower and the quantity produced is higher than the price and quantity that would yield optimal returns to a monopoly (Pm, Qm). The deadweight loss created in the long-run by the market distortions associated with supply management is represented by triangle ABC.

Figures two through four provide a detailed picture of the three markets purchasing Canadian shell eggs. This includes two domestic markets, the consumer or table egg market (fig. 2), and the processor or broken egg market (fig. 3). Egg products from domestic processors are sold both domestically and abroad. Offshore markets for processed eggs in Japan, Europe and the United States (fig. 4) absorb the residual supply of Canadian shell egg production in both shell and processed form, namely, that supply remaining after the domestic markets have been satisfied.

The current mandate of Canadian egg producers is to satisfy the demand requirements of the table egg market alone, at the compensatory price. However, the consumer demand curve shifts on a regular seasonal pattern, reaching its peaks in the second and fourth quarters, as will be illustrated in Chapter IV. In contrast, the Canadian egg-laying flock is fixed in the short run. Since the flock cannot be shifted in and out of production, CEMA management must define what level of demand they will target to establish annual production quota. Production will be targeted towards some fraction of peak weekly demand.

Hence, given the peak weekly Canadian table egg demand curve (D2 in fig. 2), CEMA attempts to set its total production quota allocation at Qc, which would satisfy the maximum level of expected weekly consumer demand at the compensatory price Pc. However, consumer demand reaches Qc only once or twice each year, and in any week will reach only some level such as curve D1. Hence fewer eggs than are produced at Qc are actually sold on the table egg market. The compensatory price facing consumers is raised by the consumer levy equal to C, and reduced by the producer contribution equal to P. Consumers will actually purchase quantity Qt in that week, leaving quantity Qc-Qt as fresh surplus product requiring immediate disposal.

The sales of Canadian egg processors (or breakers) are divided between domestic sales (fig. 3) and export sales (fig. 4). CEMA sales of eggs to domestic breakers are divided between "commitment" and "tendered" sales. Commitment sales require domestic processors to commit themselves to fixed minimum purchases two months in advance, while tendered sales dispose of those eggs remaining in CEMA's surplus after all commitment purchases. Tendered eggs are those eggs sold to domestic and foreign breakers on a bid tender basis. Domestic processors may sell the product from commitment purchases either on the domestic or on

the export markets, but product from tendered purchases may be sold only on the export markets. The distinction between commitment and tendered sales adds unnecessary detail to this study, which requires only forecasts of actual domestic and export sales by Canadian breakers. Hence this distinction will be ignored in this study.

As discussed in Chapter II, the price that Canadian breakers may charge for their processed product is restricted at or below a ceiling roughly defined by the price set by US breakers for processed product, since both Canadian and US breakers sell into the same (North American) market for further processed product (plus tariffs). Hence the US price for processed egg product largely establishes the price which Canadian breakers can afford to pay for raw shell eggs. This relationship has been formalized in the current pricing mechanism of surplus shell eggs sold for the domestic processed egg market: the price CEMA charges to breakers for these eggs is established on a formula basis, according to the landed price of US breaking stock.

Canadian processors pay the formula price for commitment purchases (intended for the domestic market) and a bid price for tendered purchases (intended for the export market). The formula price is based on the reported price for 48-lb minimum net weight nest-run eggs for breaking in the US midwest. This price is reported by the Urner-Barry information service and is referred to as the Urner-Barry formula price. The formula price (Pf in fig. 3) is currently set at one cent over the landed price of 48-lb minimum net weight nest-run US breaking stock basis Chicago, or the landed Urner-Barry price (Pub in fig. 3). In fact, eggs sold to breakers are actually priced 2¢/dozen over the Urner-Barry reported price; however, CEMA offsets 1¢/dozen by paying delivery costs on eggs sold to processors. As discussed above, the formula price is set to be lower than the price that would prevent Canadian processors from being cost-competitive with US processors on end product sold in Canada. The existence of the formula price allows Canadian processors to fulfill the critical role of surplus disposal in the egg supply management system.

Curve DD in figure 3 illustrates the derived demand of domestic breakers for shell eggs for domestic sales of processed eggs. It illustrates that the use of a formula price for breaking stock including the agreed contribution reduces breaker purchases of shell egg stocks from Q2 to Q1. Figure 3 also illustrates that there exists some price such as P1 above which domestic breakers are completely uncompetitive in the Canadian market, and above which their demand for breaking stock falls off rapidly. Hence P1 represents a turning point or kink in the derived demand curve for breaking stock. There also exists some price such as P2 at and below which Canadian breakers are able to entirely replace US imports. P2 is some distance below Pub, and not immediately below Pub, since trade considerations such as company loyalty and connections will serve to sustain the flow of transactions even when product prices become slightly uncompetitive, since the transactions costs ensure that

prices remain competitive over a small range. Since the total replacment of US imports is forbidden under article 11 of the GATT agreements, which requires that supply management systems in member countries permit a level of imports equal to that which would likely enter under free market conditions, the effective derived demand curve of processors for breaking stock for the domestic market is the length AB on curve DD.

Figure 4 illustrates the derived demand curve (DD) of Canadian processors for breaking stock for processed egg exports. Figure 4 illustrates that the quantities of breaking stock actually purchased by domestic processors for subsequent export are limited by the quantities available for sale from CEMA. At either the landed Urner-Barry price (Pub) or the bid price (Pt), domestic processors could accept greater quantities of breaking stock. The difference between Q2 and Q1 represents lost sales to domestic breakers and lost sales of Canadian value-added product in offshore markets.

3. The Model

a. introduction

The model used in this study is a modification of the egg industry sub-model used in the FARM (Food and Agriculture Regional Model) model. The FARM model is the large model used by Agriculture Canada as the basis for its quarterly outlook exercise and ongoing policy exercises. The egg industry sub-model is fully described in a forthcoming working paper by Jean-Olivier Ferron, who contributed greatly to the development of the working version of the model used in this paper. This discussion of the model will focus on the following: the structure of the model, as it embodies the structure of the industry; the variables selected to drive the model and the variables selected as the solution variables, and the justification for these selections; the constraints imposed on the model due to data difficulties and lack of resources, and the consequent development of the model to accommodate these constraints.

As described above in section 2, the Canadian egg industry serves only three markets: the domestic market for table eggs, and the domestic and export markets for processed egs. This model is structured to estimate both the demand and supply of eggs in the three markets, and the financing of surplus shell egg sales to the domestic and export markets for processed eggs. Figure five (pg 41) illustrates the current structure of the model, including the variables and assumed flows of causation.

Two fundamental identities are assumed to drive the table and processed egg sectors:

a. table egg sector: commercial gradings plus shell egg imports less shell egg exports less table egg disappearance leaves surplus shell eggs sent to breakers

b. processed egg sector: eggs sent to breakers plus opening stocks of processed eggs less closing stocks of processed eggs less exports of processed eggs less domestic disappearance of processed eggs leaves imports (requirements) of processed eggs or of shell eggs for breaking

Hence the residual to the table egg sector are the surplus shell eggs sent to breakers and the residual to the processed egg sector are the imports of processed eggs.

b. the table egg sector

Commercial gradings in the model are fixed at the level of production

quota established in the years 1984 through 1987. The intent of the model is not to forecast production requirements but rather to estimate the annual requirements for total shell egg supplies to support the annual consumption requirements of the three markets. Hence annual commercial gradings throughout the planning horizon of this study are fixed at the current level of production quota, and imports of shell and processed eggs are estimated to provide a measure of the residual supply requirements of the industry.

Exports of shell eggs for the purposes of this study are estimated at zero. In 1986 exports of shell eggs in fact registered zero, while in previous years exports varied considerably from quarter to quarter. The expected error of the model exceeded the maximum expectation of shell egg exports, suggesting that the wisest course was to set these to zero.

Shell egg imports are defined according to the farm price of US shell eggs, and acording to year-ago gradings. The farm price of US shell eggs relative to the domestic price of eggs reveals the profitability of importing shell eggs for table and processed egg consumption. The level of year-ago gradings reveals the minimum required level of shell egg imports to satisfy the commercial agreement with the United States to allow imports of shell eggs under global import quota, according to a fixed percentage of previous year's total domestic production. Total domestic production of shell eggs the previous year is estimated by adjusting upwards the previous year's comercial gradings by a fixed percentage, to allow for the difference between commercial gradings and total domestic production as estimated by Statistics Canada.

Total domestic disappearance of table eggs is forecast from estimates of per capita table egg disappearance. Per capita table egg disappearance is estimated in the usual way on the basis of the retail price of table eggs and the retail prices of the important substitutes and complements, as well as personal disposable income. The retail price of table eggs is estimated as a function of the producer price of shell eggs. In estimating the producer price of table eggs, the model attempts to simulate the results of cost-of-production (COP) formula pricing. Hence the producer price is estimated on the basis of a large number of COP formula components, including the following: the estimated price of laying mash and the feed conversion ratio, the pullet price and the rate of lay, the farm and industrial wage rates, the share of the farm workload allocated to skilled and general labour and the total work hours required on the farm, the prime rate, and the farm input price index to account for all other costs. Then the quantity of eggs sent to breakers, or the domestic production of processed eggs, is established as the residual to the table egg sector.

c. the processed egg sector

Exports of processed eggs are estimated on the basis of a trend variable, and on the basis of the relationship between the wholesale price of frozen processed eggs in the United States with the wholesale price of frozen processed eggs in Canada, adjusted for the exchange rate. The forecasts of the exports of processed eggs were then adjusted to reflect the results of a survey of domestic processors, undertaken to derive estimates of export and domestic disappearance of processed eggs. This survey is described in detail in Appendix B.

The stocks of broken egg products are estimated as a function of the level of domestic production of broken eggs. The demand for processed eggs or for broken egg products is a derived demand, in that it represents the demand of breakers for processed eggs, a demand which is filled by purchases of breaking stock. Hence the total national demand is not derived from an estimate of the per capita demand for broken egg products, but rather directly. This demand is estimated in the usual way as a function of the price paid by breakers and of the domestic wholesale price of broken egg products (with the proxy as the Ontario price of frozen egg products). The domestic disappearance of processed egg products was also estimated in the survey of domestic breakers, and these estimates provided a base for the evaluation of the reasonableness of the forecasts of domestic disappearance of processed eggs provided by the model.

Finally, to the degree that processors' increasing requirements for processed eggs or for shell eggs for breaking are not met from domestic sources, it is incumbent on the regulatory authorities to authorize greater levels of US shell and processed egg imports to support the processing sector, or alternatively, to develop a system whereby extra production quota could be distributed for lower-priced eggs (known as "b-quota") among the more efficient domestic producers. Hence under each set of conditions, the deficit in the requirements of the processing sector unfilled by domestic production is defined to be filled by US imports. No distinction is drawn between US imports of processed eggs and of shell eggs for breaking. The distinction is unnecessary for the purposes of this study. All US imports of eggs to satisfy the requirements of the processing sector are defined in shell egg equivalents, although these imports of processed eggs may arrive in either processed form or as shell eggs for breaking.

d. the levies

The consumer levy is specified as a function of the domestic use of processed eggs (ie. the quantity of surplus shell eggs sent to breakers

less the quantity of processed egg exports). In short, the consumer levy is responsible for offsetting the pricing deficit on all processed eggs sold domestically. The consumer levy is added to the producer price of shell eggs, and so it is calculated by distributing the quarterly pricing deficit over all commercial gradings. This represents the allocation of the costs of surplus shell egg sales to all domestic marketing agents of shell eggs. Then the fundamental simultaneity of the model arises through the stochastic dependency of the retail price of table eggs on the producer price (in part defined through the level of the consumer levy), which in turn defines the level of table egg consumption. The producer levy does not have any impact on the solution of the model, since it does not affect the level of gradings. These are solely defined by the level of quota, which is always completely filled. Consequently the producer contribution merely reduces the level of producer cash receipts.

The sum of the producer and consumer levies must equal the total pricing deficit generated by the sales of surplus shell eggs. Since the model is a quarterly model, this pricing deficit must be fully offset in each quarter in order to solve the model. Hence some error is inevitably introduced in utilizing a model that solves on a quarterly basis; in fact the level of surplus shell eggs generated and the level of consumer levy financing will tend to vary inversely to each other over the four quarters of the year, while allowing the funds to balance in total over the year.

e. generalities

Discrepancies in the data prevented the use in the model of series representing the levels of tendered and commitment purchases by processors, and required the selection of proxy variables. The sum of all exports of shell and processed eggs was selected as the proxy for tendered purchases of shell eggs. This is the portion of the pricing deficit for which producers are responsible. This is only a rough proxy since the timing of exports of shell and processed eggs corresponds only very roughly to the timing of the actual purchases of the breaking stock under the bid tender system by the processors. To reiterate the discussion of a previous chapter, exports of processed eggs may be made up to one year after the date of purchase of the breaking stock under a tendered bid without losing the right to claim refund of the difference between the commitment and the tendered price. Exports of shell eggs are also priced at the tendered price, since these eggs are sold almost entirely to foreign (US) breakers, who also buy on bid tennder. Commitment purchases of shell eggs may then be defined strictly as break (production of broken eggs, or sales of surplus shell eggs to breakers) less exports of processed eggs; or in other words, domestic disappearance of processed eggs.

The model is a linear model. In other words, all but one equations are specified as linear equations. Only the equation specifying the retail price of table eggs was not specified as a linear equation, but rather as a log-log equation, in order to facilitate the calculation of the relevant elasticities.

The model employs an Ontario basis for all component prices, including production inputs and the producer, processor and retail prices for shell and processed eggs. However, the model estimates all component volumes (production, imports and exports, and disappearance, in all sectors) on a national basis. The Ontario price is selected as a proxy for a national price, rather than a weighted national average price for any component, for the following reasons: first, Ontario accounts for roughly 38% of domestic production of shell eggs, while the next largest producer (Quebec) accounts for roughly only 16% of domestic shell egg production; second, the producer price in the other provinces is set in terms of fixed differentials from the Ontario price, to reflect transportation and handling and other costs; third, the retail price in all provinces closely follows the producer price, and hence the retail price in Ontario is closely linked to the retail price in all other provinces; fourth, the Canadian egg processing sector is largely concentrated in Ontario, with a significant presence in only three other provinces (British Columbia, Alberta and Manitoba), and the price to processors is established similarly to the producer price in that an Ontario price is transformed into the price to the other provinces according to fixed differentials; and finally, given the likelihood that the Ontario price adequately reflects the national price for any series, it proves to be far simpler to estimate an Ontario price than any national or weighted national average price.

The model also operates on an A Large basis. Hence all estimates of shell egg production and disappearance are converted to an AL basis, and all estimates of processed egg volumes (production, disappearance, and imports and exports) are converted into AL shell egg equivalents. The conversion factors were worked out on the basis of the previous five years' data available from Agriculture Canada sources.

One problem is that the historical record may hide inaccuracies in the data. A serious concern is the possibility that the reference US price, the Urner-Barry price, is in fact set at a premium to the actual negotiated price of principal transactions in the United States. On the other hand, it has been suggested that the costs of breaking stock imports exceed the current allowance for these costs, and that the price of surplus shell egg sales could be increased before forcing domestic processors to import US breaking stock, or before forcing further processors to import significant quantities of US processed egg products.

Finally, the net annual costs or benefits accruing to any sector are accumulated over the four quarters of the year. The final cost-benefit ratio of each alternative is defined as the net present value costs or returns to each sector, cumulative of the net annual costs and/or benefits accruing over the five-year planning horizon beginning in 1987 and ending in 1991.

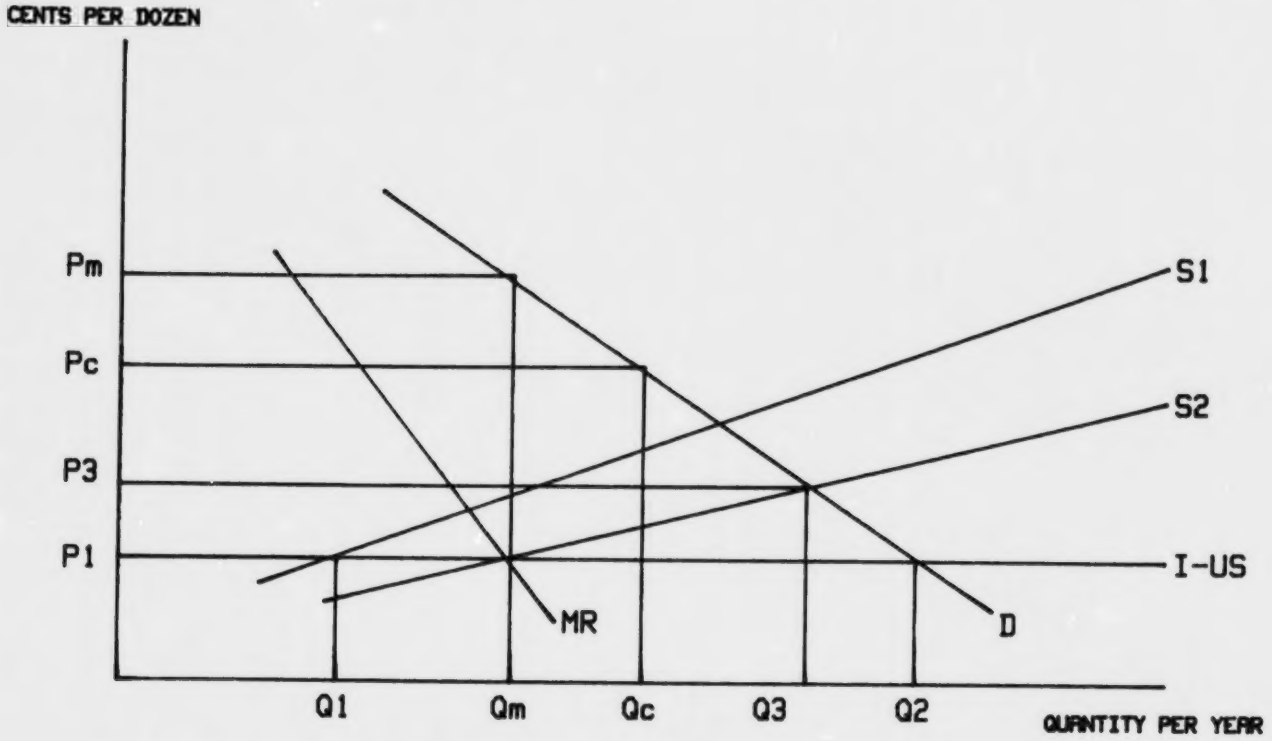
Table 4: Economic Effects of Poultry Industry Regulation in Canada, Farm Gate Level, Selected Years

	Barichello 1980	Arcus 1979	Veeman 1979	Harling & Thompson 1975-77
	----------million $----------			
EGGS:				
Economy Gain	-19		-0.4	-5
Producer Gain	+55	+45	+38	+74
Consumer Gain	-74	-56	-39	-80
BROILERS:				
Economy Gain	-13		-5	-11
Producer Gain	+57	+71	+71	+94
Consumer Gain	-73	-77	-76	-121
Importer Gain	+4			

Sources: Barichello 1982A, Arcus, Veeman, Harling and Thompson

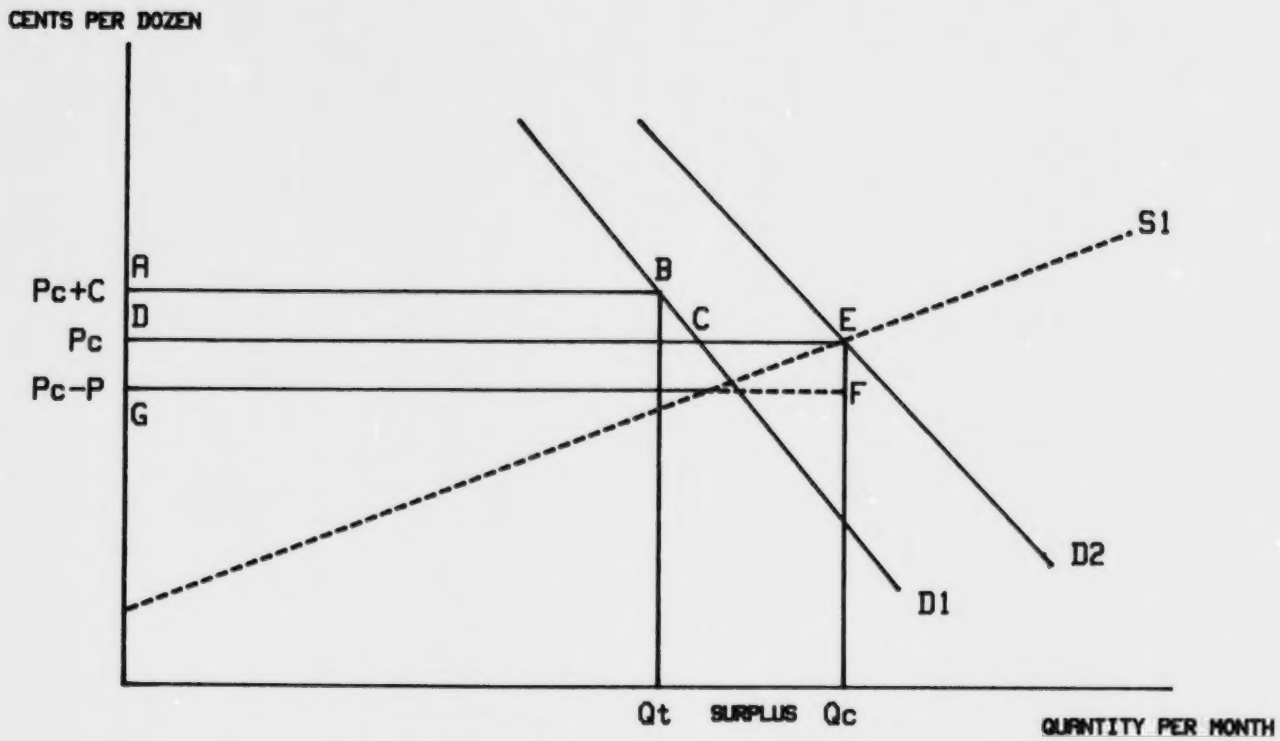
from: Schmitz (1983)

FIGURE 1: THE EGG INDUSTRY



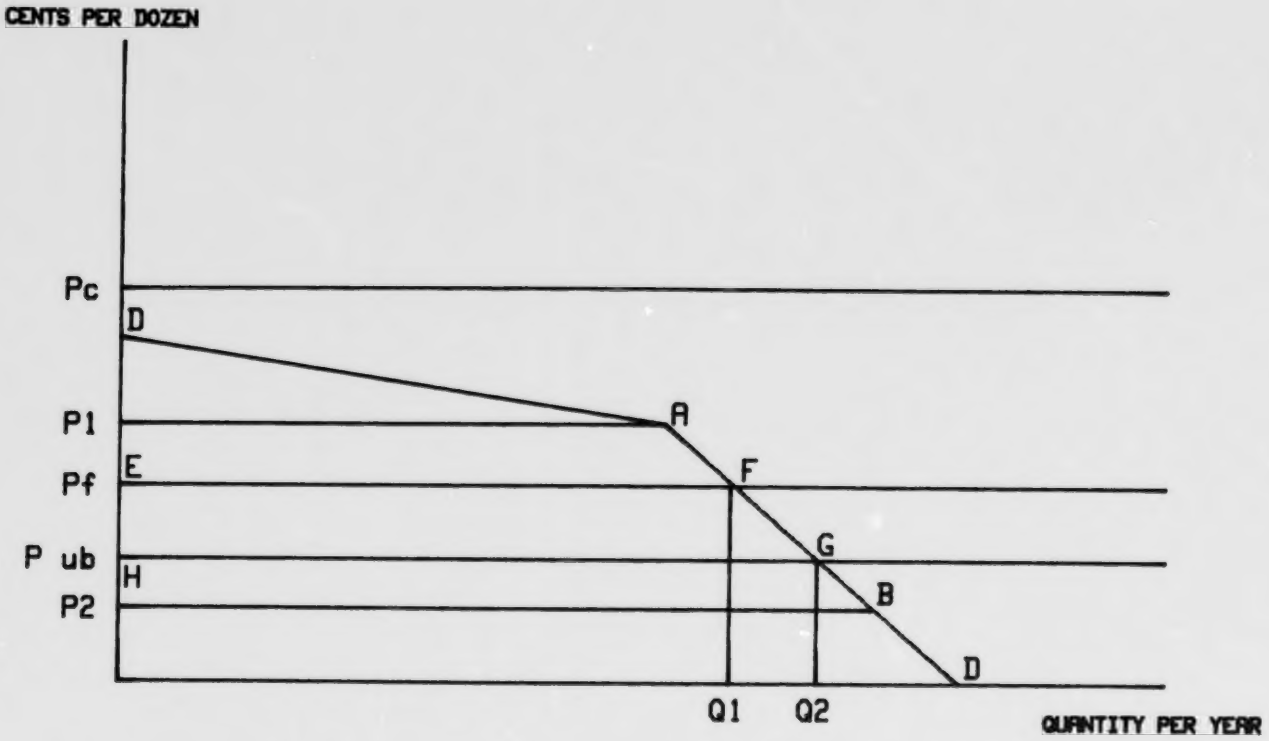
Pc,Qc : PRICE AND QUANTITY GENERATED WITH SUPPLY MANAGEMENT, YIELDING COMPENSATORY RETURNS TO PRODUCERS.
Pm,Qm : PRICE AND QUANTITY GENERATED UNDER MONOPOLY CONDITIONS.
P1,Q1,Q3 : PRICE, QUANTITY PRODUCED DOMESTICALLY AND QUANTITY IMPORTED, WITH AN OPEN BORDER.
P3,Q3 : PRICE AND QUANTITY GENERATED WITH IMPORTS RESTRICTED TO FIXED PROPORTIONS.
D,MR : CONSUMER DEMAND AND MARGINAL REVENUE CURVES.
S1 : DOMESTIC SUPPLY CURVE
S2 : DOMESTIC SUPPLY CURVE PLUS A FIXED PROPORTION OF IMPORTS.

FIGURE 2: THE TABLE EGG INDUSTRY



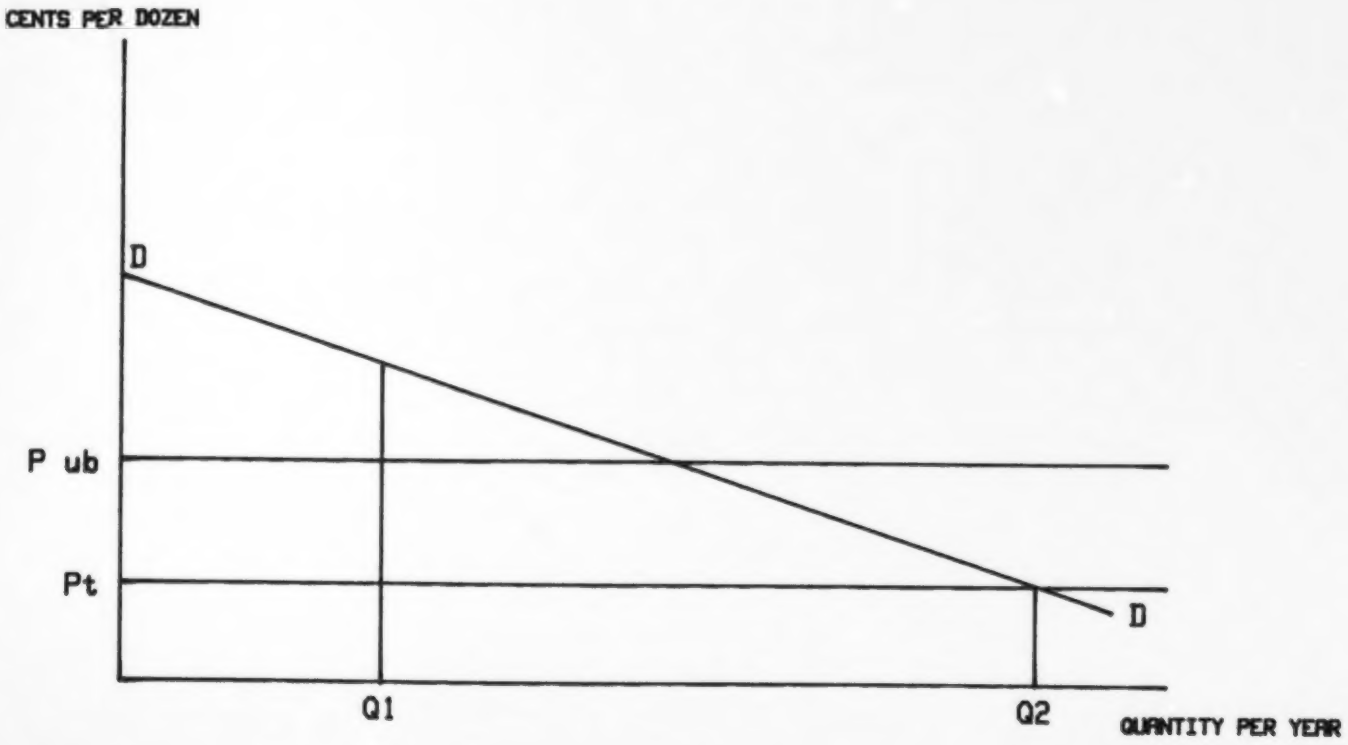
Pc,Qc : PRICE AND QUANTITY GENERATED WITH SUPPLY MANAGEMENT.
Pc+C : COMPENSATORY PRICE PLUS CONSUMER LEVY.
Pc-P : COMPENSATORY PRICE LESS PRODUCER CONTRIBUTION.
D1 : DEMAND FOR SAME MONTH.
D2 : NEAR 100% OF MAXIMAL SEASONAL DEMAND.
S1 : CANADIAN DOMESTIC EGG PRODUCTION.
Q : ACTUAL QUANTITY ABSORBED BY THE TABLE MARKET.
ABCD : CONSUMER WELFARE LOSS.
DEFG : PRODUCER WELFARE LOSS.

FIGURE 3: PROCESSOR SHELL EGG DEMAND FOR DOMESTIC SALES



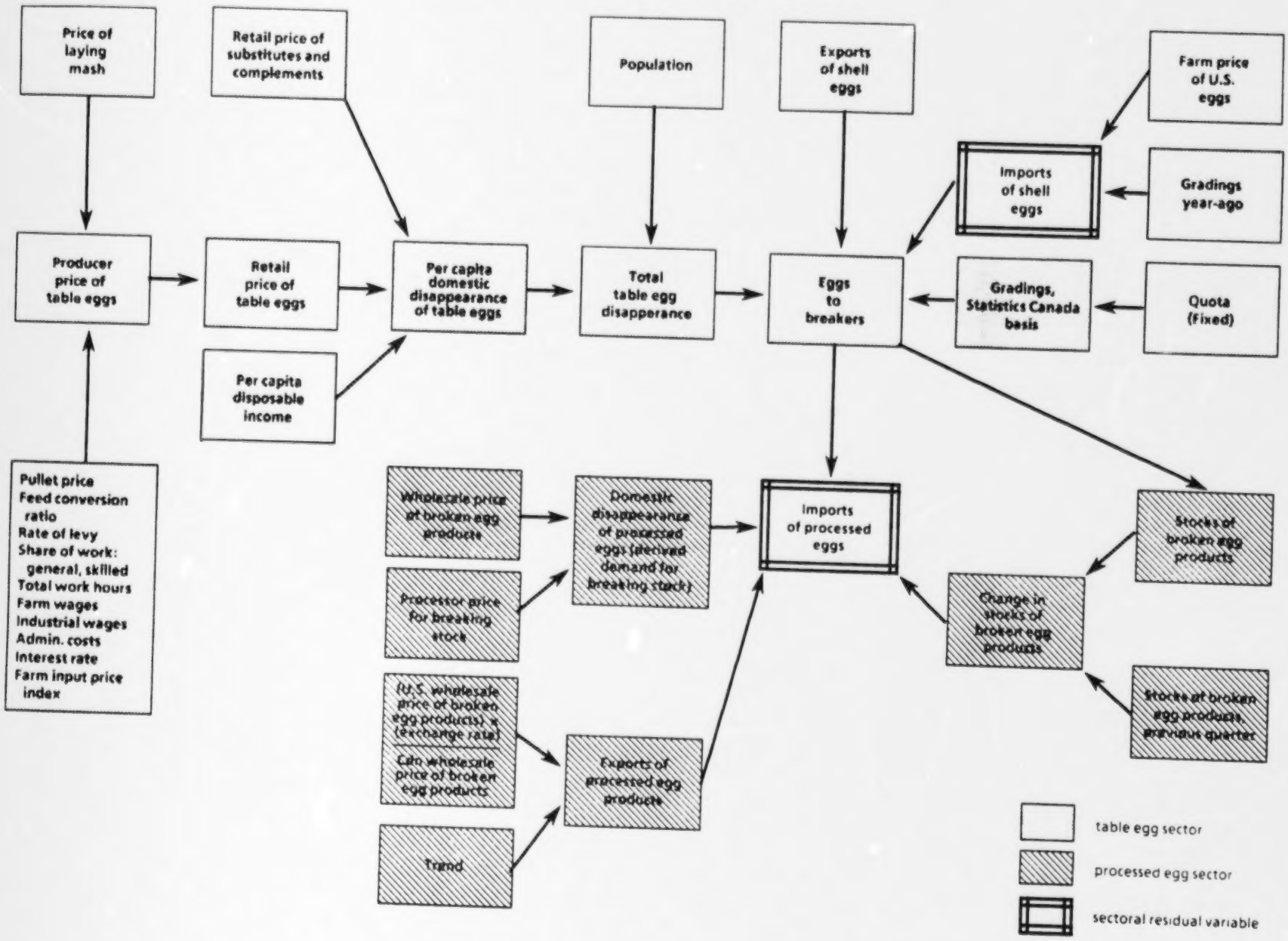
Pf : FORMULA PRICE FOR BREAKING STOCK.
P ub : URNER-BARRY PRICE, OR AVG. U.S. MID-WEST PRICE FOR BREAKING STOCK.
DD : DOMESTIC PROCESSOR SHELL EGG DEMAND FOR DOMESTIC SALES.
Q1 : COMMITMENT SALES TO DOMESTIC BREAKERS.
Q2 : POTENTIAL SALES TO DOMESTIC BREAKERS FOR THE DOMESTIC MARKET.
P1 : PRICE ABOVE WHICH DOMESTIC BREAKERS ARE UNCOMPETITIVE.
P2 : PRICE BELOW WHICH DOMESTIC BREAKERS WILL REPLACE GATT IMPORTS.
EFGH : PROCESSOR WELFARE LOSS.

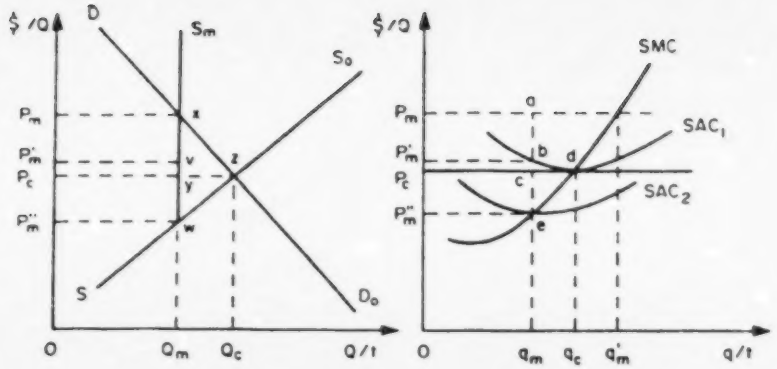
FIGURE 4: PROCESSOR SHELL EGG DEMAND FOR PROCESSED EGG EXPORTS



P ub : URNER-BARRY PRICE, OR AVG. U.S. MID-WEST PRICE FOR BREAKING STOCK.
Pt : PRICE FOR TENDERED EGG SALES.
DD : DOMESTIC PROCESSOR SHELL EGG DEMAND FOR PROCESSED EGG EXPORTS.
Q1 : ACTUAL TENDERED EGG SALES TO DOMESTIC BREAKERS.
Q2 : POTENTIAL TENDERED EGG SALES TO DOMESTIC PROCESSORS.

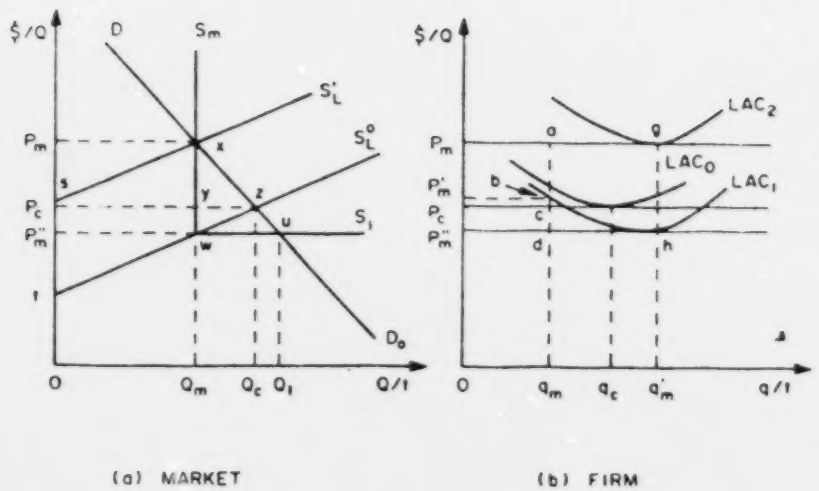
FIGURE 5 THE CANADIAN EGG INDUSTRY


Price of laying mash
Retail price of substitutes and complements
Population
Exports of shell eggs
Farm price of U.S. eggs
Imports of shell eggs
Gradings year-ago
Producer price of table eggs
Retail price of table eggs
Per capita domestic disappearance of table eggs
Total table egg disappearance
Eggs to breakers
Gradings, Statistics Canada basis
Quota (Fixed)
Per capita disposable income
Pullet price
Feed conversion ratio
Rate of levy
Share of work: general, skilled
Total work hours
Farm wages
Industrial wages
Admin. costs
Interest rate
Farm input price index
Wholesale price of broken egg products
Domestic disappearance of processed eggs (derived demand for breaking stock)
Imports of processed eggs
Stocks of broken egg products
Processor price for breaking stock
Change in stocks of broken egg products
(U.S. wholesale price of broken egg products) x (exchange rate)
Can wholesale price of broken egg products
Exports of processed egg products
Stocks of broken egg products, previous quarter
Trend
table egg sector
processed egg sector
sectoral residual variable



(a) MARKET (b) FIRM

Figure 1: Short-Run Effects of the Introduction of Quotas



(a) MARKET (b) FIRM

Figure 2: Long-Run Effects of the Introduction of Quotas

from: Van Kooten & Spriggs (1984)

IV. THE INDUSTRY: TRENDS & OUTLOOK

This chapter examines both the opportunities for industry growth, and the pressures that are encouraging changes to the regulatory structure. The chapter presents the historical trends and the five-year forecast for the consumption, production and supply of shell and processed eggs in the Canadian and United States markets, as of February 1987. The study explores the record of domestic surplus shell egg production, and evaluates the current capacity of domestic production to satisfy the breaking stock requirements of the domestic processing sector. The discussion then addresses the trends and outlook for prices in the Canadian table and processed egg markets, as of February 1987. Finally the paper examines the procedures and success of the financing arrangements used to offset surplus shell egg disposal costs. The trends and outlook in the industry will be illustrated with tables and figures, attached at the end of this chapter. The supporting data may be obtained as a package from Agriculture Canada.

1. Consumption

Figures one through eight illustrate the characteristics of consumption in the Canadian and US table and processed egg markets. Figures one and two illustrate the source of the financial pressures: Canadian table egg disappearance from commercial sources has been falling since its peak in 1982, while per capita table egg consumption has been falling for the last fifteen years. Table egg disappearance from commercial sources represents consumption of shell eggs passed through federally registered grading stations. This table egg disappearance appears to rise through the seventies until 1982, while per capita table egg consumption as portrayed in Figure two appears to fall, since an increasing proportion of Canadian producers have utilized the federally-registered grading system since the late sixties.

However, in 1984 and 1985, per capita table egg disappearance stabilized at 17.6 dozens. A slight fall in 1986 is expected to be followed by fairly constant per capita table egg consumption through the remainder of the eighties. This will result from retail egg prices that are expected to rise at a rate below the rate of food and overall inflation, due to the close relationship between egg prices and feed prices, forecast to remain very low for some years. The rise in the national population in 1987 may just offset the continued fall in per capita table egg consumption to generate increased total Canadian table egg demand. In the final years of the decade, the growth in the national population is expected to generate continued increased table egg demand requirements in each year. Total table egg consumption is forecast to

rise from 24.273 and 24.321 million boxes of 15 dozen in 1986 and 1987, respectively, to 24.593, 24.635, 24.733 and 24.548 million boxes, respectively, in the four years to the end of this study's five-year plannning horizon.

Figure three portrays the trend and outlook in total processed egg consumption in Canada. The figure illustrates the substantial growth that has occurred in total processed egg consumption in Canada in the eighties. Figure three also illustrates the potential for growth in total Canadian processed egg disappearance over the planning horizon. This figure presents two forecasts of the annual growth in total processed egg domestic disappearance. The first forecast is that generated by the Agriculture Canada econometrics model of the egg industry, of which processed egg disappearance is one component. The second forecast is that generated by a survey of Canadian egg processors from May through November 1986.

The use of a survey was justified by the difficulties of applying the usual economic methods to generate an acceptable outlook for the markets of Canadian processed egg products. Domestic breakers sell processed egg product into both the domestic and the international markets. Both of these markets present difficulties. The first difficulty is that considerable growth has characterized these markets in recent years, within a period too short for reasonable evaluation of the trends. The second difficulty is that identification and careful evaluation of factors driving the offshore markets is difficult to establish.

In order to develop the most accurate forecasts of domestic and offshore processed egg demand over the planning horizon of this study (1987 - 1991), Agriculture Canada undertook a formalized survey of the best estimates of the processing industry. This formalized survey proceeded according to the principles of the Delphi method (1). This method involves repeated presentations of a questionnaire to a set of respondents. At the second and subsequent presentations, the respondents are also given the unidentified answers of all respondents in the previous go-round, as well as other relevant information. The process repeats until a consensus has been reached. The literature records that the greatest degree of improvement in the level of consensus takes place between the first and second rounds. The Agriculture Canada survey was limited to two rounds and, in fact, considerable agreement was realized by the second round.

The Agriculture Canada model predicts limited growth at an annual average of only 2.73% for domestic processed egg consumnption through the remaining years of the eighties and the early nineties. The growth rate proceeds somewhat more strongly through 1987 at a rate of roughly 4%, but drops off in the final four years of the planning horizon, due to the depressing impacts of the recession forecast for the end of the decade. The consensus established by the Delphi survey does not appreciably diverge from the predictions of the Agriculture Canada

model: an annual growth rate of roughly 3%, with a slight reduction in growth towards the end of the decade. Table one presents the year-by-year outlook for domestic and export consumption of domestically-produced processed egg products, according to both the Agriculture Canada model and the summary results of the Delphi survey.

According to reports from the processing sector, the increased use of processed eggs has been due to increased use of broken eggs and broken egg components in further processed products. For example, considerably increased use of broken eggs is reported for the trendy fresh pasta and for other bakery products. Secondly, the continued trend towards increasing consumption of prepared meals at home or at restaurants requires increasing use of broken eggs in their preparation.

Figure four illustrates the characteristics of domestic Canadian processed egg disappearance in the three component markets, for egg whites or albumins, yolks, and whole egg mix. Table two presents the annual disappearance of each of these components since 1979, and Table three presents the annual disappearance of each component according to the type of final preparation: liquid, frozen, or dried. These tables include calculations of annual absolute and percentage rates of growth. Figure four and Table two illustrate that the growth in domestic processed egg disappearance has not occurred evenly between the three components. Absolute growth in disappearance has ranked highest in whole egg mix, in albumins and in yolks, respectively, but percentage growth has ranked highest in albumins, and then respectively less in yolks and whole eggs.

Figures five and six illustrate the seasonal nature of table egg and processed egg disappearance, according to the three-year average (1984-86) and according to different time scales. Figure five highlights the quarterly peak of table egg consumption in the fourth quarter; figure six emphasizes the seasonality of table egg consumption by increasing the scale of the X-axis from quarterly to monthly, illustrating the significant differences between table egg consumption during the year-end festival period, and during the months immediately preceding and succeeding these holiday times. Figure six also portrays the local peak of table egg consumption in July, reflecting a three-year history of large-scale retail specialing in that month. Figures five and six also illustrate the intense seasonality of processed egg consumption, which is similar to but only somewhat more pronounced than the seasonality of table egg consumption. Processed egg disappearance peaks both in the year-end holiday period and in the Easter holiday period.

On a percentage basis, according to the three-year average, 26.7% of total table egg consumption takes place during the fourth (holiday) quarter, while 24.0%, 24.3% and 25.0% take place during the first through the third quarters, respectively. This yields an average difference of 860 thousand boxes of 15 dozen in table egg consumption

between the fourth and the first quarters. Similarly, the three-year averages indicate that 22.5%, 26.4%, 22.6% and 28.5% of total processed egg consumption tend to occur during the first through the fourth quarters, respectively, yielding an average difference of 1.3 liquid tonnes between the fourth and first quarters.

Figure seven illustrates per capita table and processed egg consumption in the United States. Figure eight portrays domestic consumption of processed egg products as a percentage of total domestic egg consumption for both Canada and the United States from 1982 through 1986. Figure eight illustrates that although the trends in the two North American countries are similar, the patterns of consumption differ: per capita processed egg consumption in the US is significantly greater than in Canada. In short, although Canadian domestic disappearance of processed egg products has increased considerably as a fraction of total egg use by Canadian consumers in the past four years, there is still likely considerable room for sustained growth in the share of domestic egg consumption accounted for by processed egs. In the United States, processed egg consumption as a fraction of total egg consumption has grown at roughly the same rate as in Canada, but has accounted for roughly two and one-half percent more of the total domestic egg market. In 1986, the difference shrank for the first time in the five-year period. To the end of fourth-quarter 1986, processed egg disappearance in Canada accounted for 13.4% of total Canadian egg consumption, while in the United States to the end of third-quarter 1986, processed eggs accounted for 15.2% of total egg consumption.

Figure nine illustrates the growth of Canadian processed egg exports, on a product basis. Tables four and five present the levels of exports of processed egg products by product type, in total and according to the preparation, along with the annual absolute and percent growth. Figure nine illustrates that growth in albumin exports have considerably led growth in yolk exports, which have been again greater than growth in whole egg exports. Albumin exports have been stimulated greatly by a considerable export demand for lyzozyme, a high-priced enzyme derivative of egg whites used in pharmaceuticals and as a food preservative. However, export levels of lyzozyme are not recorded. Exports of albumins are also supported by the considerable Japanese market for lyzozyme-extracted albumins, which provides a convenient disposition for the extracted albumins (2). The growth in the world albumin export makets has been so considerable that the world price for albumins is reported to have doubled in the last two years. The export markets for yolks have not, however, kept pace with the growth in the albumin markets, leading to considerable price weakness in the yolk markets. Egg processors are experiencing considerable difficulty in disposing of surplus yolk products.

Figure three illustrates that growth of Canadian processed egg exports in total has proceeded at a rate in recent years that has far exceeded the growth in the domestic market for processed eggs and processed egg

products. Growth of all processed egg exports has averaged 55% per annum since 1980, compared to an annual average growth of only 5% in total domestic disappearance of processed eggs. The Agriculture Canada industry model predicts that processed egg exports will continue to grow over the five years of the planning horizon at well over the growth rate of the domestic market, or at an average 16.74% per year. However, this high growth rate reflects the large forecast recovery in exports in 1987 over 1986, a year of depressed exports due to inadequate supplies. Excluding 1987, the model predicts an average annual growth of 9.3% in processed egg exports. The model predicts this growth on the basis of the trend variable and on the basis of relative Canadian and US prices. The consensus of the Delphi survey again substantiates the results of the Agriculture Canada model: an annual growth of 8-10% in processed egg exports is predicted through the five years of the planning horizon. Similarly to the forecasts of the domestic market, the growth of processed egg exports is expected to slow in the final years of the planning horizon, reflecting the inhibiting effects of the forecast world recession.

2. Production and Supply

Canadian shell egg production has stabilized in the last four years. The stable production level reflects an unchanging level of total quota. Slight fluctuations in the level of annual commercial domestic shell egg gradings reflect the definition of quota in numbers of hens, and the consequent variation caused by changing lay rates. The fluctuations also reflect variations in the degree of use of the commercial grading system by producers, in contrast to direct sales to consumers. Figure ten illustrates the slight seasonality of domestic shell egg production, due to changing light levels through the year.

American shell egg production has risen and fallen over the last decade in response to changing profit levels. For lengthy periods during the eighties, US shell egg production has been unprofitable: net returns to producers have been at or below the cost of production. Figure eleven portrays the shifting level of profitability of US shell egg production. Currently, egg production has fallen under year-earlier levels, in the face of rising demand, and returns to producers have been in the black since mid-1986. Although the market signals suggest that a period of expansion ought to begin, the industry shows no signs of the investment in facilities and layers that would suggest coming growth in production. The USDA forecasts growth in US domestic shell egg production of one percent over year-earlier levels in each quarter through 1987, but they warn that it is quite likely that these levels may in fact not be reached, if producers conservatively refrain from their usual expansionary trends.

Each week domestic shell egg production in most provinces exceeds provincial table egg requirements. The quantity of breaking stock eggs

available to domestic processors depends strictly on the comparative weekly level of domestic table egg consumption in each province. Figure twelve portrays the monthly total level of Canadian commercial shell egg gradings, of domestic table egg consumption, and of surplus egg generation, over the five-year period from 1982 through 1985. Figure thirteen illustrates the three-year average (1984-86) levels of these three variables. Figure thirteen illustrates that average surplus generation varies significantly from month to month through the year, falling to roughly 160,000 boxes of 15 dozen during the peak table egg demand month of December.

Figure fourteen illustrates the observed demand for breaking stock by the domestic processing egg sector. Figure fourteen illustrates purchases of surplus shell eggs by processors, according to whether these eggs are intended for use on the domestic or the export market, as revealed by the purchase of these eggs under commitment or by tender. The sharp rise in tendered egg purchases highlights the considerable increase in the export market for Canadian processed eggs and processed egg products. Total purchases of breaking stock by Canadian processors ranges from roughly 40000 boxes of 15 dozen per week at minimum to roughly 90000 boxes of 15 dozen per week at peak months. The total capacity of the Canadian processing sector is estimated to be at least 100,000 boxes per week.

Figure fifteen illustrates the level of shell egg exports and imports since 1978. Shell egg exports are virtually entirely constituted by CEMA sales to foreign breakers under bid tender. Figure fifteen illustrates that the demand of Canadian processors for breaking stock has increased to the point that, since roughly mid-1985, Canadian processors have successfully bid for the entire surplus egg production of the domestic egg industry. Hence figure fifteen suggests that, with no increase in the domestic production quota and/or no recourse to increased imports of breaking stock, and with the forecast increase in total table egg consumption, the level of surplus generation may tightly constrain future growth of the domestic processing sector below the forecast potential rate of growth.

Together, figures three and fourteen illustrate that the requirements of domestic breakers almost certainly already exceed the available levels of surplus production. Figure fourteen illustrates that the level of tendered egg purchases by domestic breakers has risen dramatically in 1985 and in 1986. These tendered egg purchases are purchased at the bid price, some twenty cents below the formula price. However, in practice, domestic breakers pay the formula price for these eggs and receive a rebate of the difference when they can demonstrate proof of export. Domestic breakers have one full calendar year from date of purchase to demonstrate proof of export. Figure three illustrates that in 1986 processed egg exports have fallen considerably below year-earlier levels, to say nothing of not growing in pace with the growth in tendered egg purchases. Hence figures three and fourteen together

suggest that domestic processors are planning to supply export markets, but lack the breaking stock to generate the processed egg product to do so. The drop in processed egg exports, in contrast to the rise in tendered egg purchases, suggests that the eggs purchased on tender are being used by domestic processors to ensure that their domestic accounts are fully supplied, before tackling the export market.

The total supply of shell eggs in Canada is constituted of the sum of domestic production plus imports, including both global and supplementary imports. Table six lists the quarterly rate of entry of supplementary shell egg imports according to the category of weight (AEL, AL, AM, AS) since 1984, when the definitions of the weight categories were changed. The table demonstrates that a significant volume of table grade (A Large and A Extra Large) shell eggs were brought in during the fourth quarter of each of the last three years, despite the excess of total domestic production over total table egg requirements for the quarter. The fourth-quarter table egg supplementary imports averaged 1.968 million dozens, or 131.3 thousand boxes.

These supplementary imports may be understood to reflect the true balance between domestic shell egg production and domestic table egg consumption, within the true time frame of the table egg market. Since the table egg market operates within a time frame of roughly one week, supplementary imports are needed when table requirements exceed available supply. Domestic production may be insufficient in any week, due either to excessive regional requirements due to specialing, to problems with interprovincial movement due to unavoidable inspection lags, or to other difficulties. The consistency of the level of supplementary imports during the fourth quarter suggests that these problems are fairly well entrenched within the current structure of supply and demand.

3. Pricing

Table seven lists the changing levels since 1978 of the consumer levy, and of the producer and processor contributions, as well as the planned levels of these levies through 1987. Figure sixteen illustrates the changing levels of funds in the consumer and producer accounts. These fund levels reflect the inputs of the consumer levy and the producer contribution to the respective accounts, and the producer and processor contributions to the special growth fund of the consumer account.

The cost of surplus disposal on these markets reflects numerous factors: the compensatory or producer price of eggs, the price at which the surplus eggs are sold, and the transactions costs of surplus disposal. Figure seventeen illustrates the quarterly Canadian formula price for AL surplus eggs in Ontario, and the Ontario producer price for AL shell eggs, from 1982 through the end of the planning horizon. The breaker

price for eggs reflects the Chase Econometrics forecast of the US farm price for eggs, which provides the reference for estimating the price of breaking stock in the United States and, in turn, in Canada. The formula price of breaking stock to breakers for the domestic market was capped at 95 cents/dozen in 1984, when the impact of the avian influenza sharply cut supplies of breaking stock in the United States and dramatically boosted the price of breaking stock.

The difference between the producer and the formula price for breaking stock is the initial cost of surplus disposal. The final cost of surplus disposal includes the transactions expenditures required in the disposal of each dozen, including insurance, grading, and so on. For the purposes of this study, these costs are assumed to remain constant through the planning horizon of this study.

footnotes

(1) The Delphi method has been widely used as a systematic forecasting and problem-solving procedure involving the exercise of professional judgment by a panel of experts. Briefly, the Delphi procedure is to repeatedly submit a question or proposal to a panel of experts, while taking precaution to respect the anonymity of their responses. At each iteration of the process subsequent to the first, the experts are presented with the summarized results of the previous iteration, which information contributes to the revision of their response. The process continues until little or no further convergence of the opinion of the experts is expected (Janssen 1978).

Cary and Salmon (1979) record that the principal assumption and the assumed value of the Delphi is that through the use of anonymity, controlled feedback and statistical summary of responses, it reduces the effect of non-objective variables founds in direct confrontation group processes. In fact, they report that Dalkey's (1972) results at Rand Corporation demonstrated that the group estimate in a controlled, anonymous feedback series of iterations yielded more accurate results than group estimates made in face-to-face situations. Furthermore, Cory and Salmon (1979) report that the major part of convergence takes place between the first and second rounds.

In forecasting, Goldstein (in Linstone and Turoff, eds. 1975) suggested that the first iteration present the panel with a trend line, and that subsequent iterations include alternate trend lines enclosing the range of 50% or more of the responses to the previous iteration. This procedure was adopted in this study.

(2) Lyzozyme-extracted albumins have been shown to lose none of their food value, since the lyzozymes are normally burned off during cooking.

TABLE ONE

FORECAST USE OF DOMESTIC PROCESSED EGG PRODUCTION, BY DESTINATION
thousand boxes

	DOMESTIC	EXPORTS	TOTAL
1986	3346	957	4303
1987	3495	1259	4754
1988	3594	1401	4995
1989	3580	1516	5096
1990	3690	1652	5342
1991	3825	1796	5621

ABSOLUTE GROWTH BY DESTINATION, YEAR OVER YEAR
thousand boxes

	DOMESTIC	EXPORTS	TOTAL
1986	-	-	-
1987	149	302	451
1988	99	142	241
1989	-14	115	101
1990	110	136	246
1991	135	144	279
avg	96	168	264

PERCENTAGE GROWTH BY DESTINATION, YEAR OVER YEAR
thousand boxes

	DOMESTIC	EXPORTS	TOTAL
1986	-	-	-
1987	4.45	31.53	10.48
1988	2.83	11.28	5.07
1989	-0.39	8.21	2.02
1990	3.07	8.97	4.83
1991	3.66	8.72	5.22
avg	3	14	6

TABLE TWO

DOMESTIC DISAPPEARANCE OF PROCESSED EGG PRODUCTS, BY TYPE
liquid metric tonnes

	ALBUMINS	WHOLE EGGS	YOLKS	TOTAL	TOTAL ØØØ bxs
1979	338Ø	12716	3738	19833	24Ø7
198Ø	3977	12Ø47	4ØØ6	2ØØ3Ø	243Ø
1981	3723	14216	398Ø	21919	266Ø
1982	4384	12731	4176	21291	2581
1983	463Ø	12579	4324	21533	2673
1984	4391	13951	45Ø8	22852Ø	27Ø5
1985	4823	14317	5Ø46	24185	2879
1986	6115	15976	5187	27278	3346

ABSOLUTE GROWTH BY PRODUCT TYPE, YEAR OVER YEAR
liquid metric tonnes

	ALBUMINS	WHOLE EGGS	YOLKS	TOTAL	TOTAL ØØØ bxs
1979	-	-	-	-	-
198Ø	597	-669	268	197	24
1981	-254	2169	-26	1889	229
1982	661	-1485	197	-627	-78
1983	246	-152	148	242	92
1984	-24Ø	1372	185	1317	32
1985	432	366	538	1336	174
1986	1293	1659	141	3Ø93	467
avg	391	466	2Ø7	1Ø64	134

PERCENTAGE GROWTH BY PRODUCT TYPE, YEAR OVER YEAR

	ALBUMINS	WHOLE EGGS	YOLKS	TOTAL	TOTAL
1979	-	-	-	-	-
198Ø	17.67	-5.26	7.18	Ø.99	Ø.99
1981	-6.39	18.Ø1	-Ø.66	9.43	9.43
1982	17.76	-1Ø.45	4.94	-2.86	-2.95
1983	5.61	-1.19	3.53	1.13	3.56
1984	-5.17	1Ø.91	4.27	6.12	1.19
1985	9.84	2.62	11.93	5.85	6.42
1986	26.81	11.59	2.79	12.79	16.24
avg	9.45	3.75	4.85	4.78	4.98

note: the calculations of the percentage growth in total processed egg exports differ between columns five and six, because the distribution of shell eggs broken among the weight categories differs from year to year.

TABLE THREE

DOMESTIC DISAPPEARANCE OF PROCESSED EGG PRODUCTS,
BY TYPE AND PREPARATION
metric tonnes

	ALBS DRIED	ALBS FROZEN	ALBS LIQUID	WHOLE DRIED	WHOLE FROZEN	WHOLE LIQUID	YOLKS DRIED	YOLKS FROZEN	YOLKS LIQUID
1979	322	679	92	659	7061	3019	567	1481	952
1980	297	1165	406	673	6290	3066	562	2401	312
1981	296	1289	34	657	8042	3547	666	2185	264
1982	381	1259	39	761	6240	3447	497	2461	572
1983	400	1115	275	694	6541	3262	619	2266	634
1984	355	932	583	850	6645	3906	534	2449	831
1985	335	1657	452	810	7394	3683	733	2812	548
1986	463	1514	851	863	7369	5155	659	3134	537

ABSOLUTE GROWTH BY PRODUCT TYPE, YEAR OVER YEAR
metric tonnes

	ALBS DRIED	ALBS FROZEN	ALBS LIQUID	WHOLE DRIED	WHOLE FROZEN	WHOLE LIQUID	YOLKS DRIED	YOLKS FROZEN	YOLKS LIQUID
1979	-	-	-	-	-	-	-	-	-
1980	-25	485	314	14	-771	48	-5	920	-640
1981	-1	124	-371	-16	1752	480	104	-217	-49
1982	85	-30	5	104	-1802	-100	-169	276	308
1983	19	-144	236	-67	301	-185	122	-195	62
1984	-45	-183	308	156	104	644	-85	183	197
1985	-20	725	-131	-40	749	-223	199	363	-283
1986	128	-143	399	53	-25	1472	-74	322	-11
avg	20.14	119.22	108.48	29.13	44.04	305.19	13.14	236.08	-59.30

PERCENTAGE GROWTH BY PRODUCT TYPE, YEAR OVER YEAR

	ALBS DRIED	ALBS FROZEN	ALBS LIQUID	WHOLE DRIED	WHOLE FROZEN	WHOLE LIQUID	YOLKS DRIED	YOLKS FROZEN	YOLKS LIQUID
1979	-	-	-	-	-	-	-	-	-
1980	-8	71	343	2	-11	2	-1	62	-67
1981	0	11	-91	-2	28	16	18	-9	-16
1982	29	-2	13	16	-22	-3	-25	13	117
1983	5	-11	605	-9	5	-5	25	-8	11
1984	-11	-16	112	22	2	20	-14	8	31
1985	-6	78	-22	-5	11	-6	37	15	-34
1986	38	-9	88	7	0	40	-10	11	-2
avg	6.70	17.30	149.59	4.44	1.70	9.01	4.32	13.16	5.73

TABLE FOUR

EXPORTS OF PROCESSED EGG PRODUCTS, BY TYPE
liquid metric tonnes

	ALBUMINS	WHOLE EGGS	YOLKS	TOTAL	TOTAL 000 bxs
1979	1095	245	16	1355	164
1980	3931	263	241	4435	538
1981	2779	0	924	3703	449
1982	1789	136	235	2159	262
1983	4735	432	511	5678	705
1984	6342	387	1193	7922	938
1985	8596	100	2171	10868	1293
1986	6639	40	1361	8040	957

ABSOLUTE GROWTH BY PRODUCT TYPE, YEAR OVER YEAR
liquid metric tonnes

	ALBUMINS	WHOLE EGGS	YOLKS	TOTAL	TOTAL 000 bxs
1979	-	-	-	-	-
1980	2836	18	225	3080	374
1981	-1152	-263	683	-732	-89
1982	-991	136	-689	-1544	-188
1983	2947	296	276	3519	443
1984	1607	-45	682	2245	233
1985	2254	-287	978	2946	356
1986	-1957	-60	-810	-2827	-336
avg	792	-29	192	955	113

PERCENTAGE GROWTH BY PRODUCT TYPE, YEAR OVER YEAR

	ALBUMINS	WHOLE EGGS	YOLKS	TOTAL	TOTAL
1979	-	-	-	-	-
1980	259.06	7.41	1437.97	227.20	227.20
1981	-29.30	-100.00	283.89	-16.50	-16.50
1982	-35.65	-100.00	-74.61	-41.70	-41.75
1983	164.75	217.65	117.65	162.96	169.26
1984	33.95	-10.42	133.61	39.53	33.06
1985	35.54	-74.16	82.03	37.18	37.93
1986	-22.77	-60.00	-37.30	-26.01	-26.01
avg	57.94	-17.07	277.60	54.67	54.74

note: the calculations of the percentage growth in total processed egg consumption differ between columns five and six, because the distribution of shell eggs broken among the weight categories differs from year to year.

TABLE FIVE

EXPORTS OF PROCESSED EGG PRODUCTS, BY TYPE AND PREPARATION
metric tonnes

	ALBS DRIED	ALBS FROZEN	ALBS LIQUID	WHOLE DRIED	WHOLE FROZEN	WHOLE LIQUID	YOLKS DRIED	YOLKS FROZEN	YOLKS LIQUID
1979	135	Ø	Ø	61	Ø	Ø	7	Ø	Ø
198Ø	485	Ø	Ø	66	Ø	Ø	73	Ø	72
1981	3Ø1	343	Ø	Ø	Ø	Ø	391	Ø	24
1982	195	2Ø9	Ø	34	Ø	Ø	1Ø2	Ø	Ø
1983	58Ø	37	Ø	1Ø8	Ø	Ø	222	Ø	Ø
1984	783	Ø	Ø	92	19	Ø	326	398	45
1985	1Ø54	Ø	59	14	Ø	44	264	1389	175
1986	791	2Ø9	23	1Ø	Ø	Ø	281	649	66

ABSOLUTE GROWTH BY PRODUCT TYPE, YEAR OVER YEAR
metric tonnes

	ALBS DRIED	ALBS FROZEN	ALBS LIQUID	WHOLE DRIED	WHOLE FROZEN	WHOLE LIQUID	YOLKS DRIED	YOLKS FROZEN	YOLKS LIQUID
1979	-	-	-	-	-	-	-	-	-
198Ø	35Ø	Ø	Ø	5	Ø	Ø	67	Ø	72
1981	-185	343	Ø	-66	Ø	Ø	318	Ø	-48
1982	-1Ø6	-134	Ø	34	Ø	Ø	-289	Ø	-24
1983	385	-172	Ø	74	Ø	Ø	12Ø	Ø	Ø
1984	2Ø3	-37	Ø	-16	19	Ø	1Ø4	398	45
1985	271	Ø	59	-78	-19	44	-62	991	13Ø
1986	-263	2Ø9	-36	-4	Ø	-44	17	-74Ø	-1Ø9
avg	94	3Ø	3	-7	Ø	Ø	39	93	9

PERCENTAGE GROWTH BY PRODUCT TYPE, YEAR OVER YEAR

	ALBS DRIED	ALBS FROZEN	ALBS LIQUID	WHOLE DRIED	WHOLE FROZEN	WHOLE LIQUID	YOLKS DRIED	YOLKS FROZEN	YOLKS LIQUID
1979	-	-	-	-	-	-	-	-	-
198Ø	259	-1ØØ	-1ØØ	7	-1ØØ	-1ØØ	98Ø	-1ØØ	-1ØØ
1981	-38	-1ØØ	-1ØØ	-1ØØ	-1ØØ	-1ØØ	433	-1ØØ	-67
1982	-35	-39	-1ØØ	-1ØØ	-1ØØ	-1ØØ	-74	-1ØØ	-1ØØ
1983	197	-82	-1ØØ	218	-1ØØ	-1ØØ	118	-1ØØ	-1ØØ
1984	35	-1ØØ	-1ØØ	-15	-1ØØ	-1ØØ	47	-1ØØ	-1ØØ
1985	35	-1ØØ	-1ØØ	-85	-1ØØ	-1ØØ	-19	249	289
1986	-25	-1ØØ	-61	-29	-1ØØ	-1ØØ	6	-53	-62
avg	61	-89	-94	-15	-1ØØ	-1ØØ	213	-43	-34

TABLE SIX

SUPPLEMENTARY SHELL EGG IMPORTS, GRADES AEL, AL, AM, AS
dozens

		AEL	AL	AM	AS
1984	q1		900		
	q2		210	46500	
	q3		472950	22500	
	q4	63000	1710501	132150	22500
1985	q1		472620	30	
	q2		90000	45210	
	q3	15000	1045500	420	
	q4	15000	2067000	6	
1986	q1		567000		
	q2	45000	360210		56000
	q3	48750	1148700		28000
	q4	57375	1993965	277440	22500
avg	q1	0	350503	3755	0
	q2	8250	98160	31535	9333
	q3	10625	599125	3820	4667
	q4	45125	1923822	71016	7500

TABLE SEVEN

SCHEDULE OF CEMA LEVIES, 1978 - 1986

cents/dozen

(no entry in a cell indicates continuation from the previous period)

year	weeks	consumer levy	producer contrbtn	processor contrbtn	CEMA admin	provincial admin
1978	1 - 26	4.5	Ø.Ø	Ø.Ø	1.Ø	1.5
	27 - 52	3.5				
1979	1 - 6	3.Ø				
	7 - 41	2.5				
	42 - 52	1.5				
198Ø	1 - 3					
	4 - 48	2.5				
	49 - 52	2.7	1.3			
1981	1 - 28					
	29 - 52	2.5	3.Ø			
1982	1 - 27					
	28 - 52		2.Ø			
1983	1 - 45	2.Ø			1.5	
	46 - 52	2.8	3.Ø			
1984	1 - 26					
	27 - 52					2.Ø
1985	1 - 52	3.5	3.Ø			
1986	1 - 13					
	14 - 52		2.Ø	1.Ø		

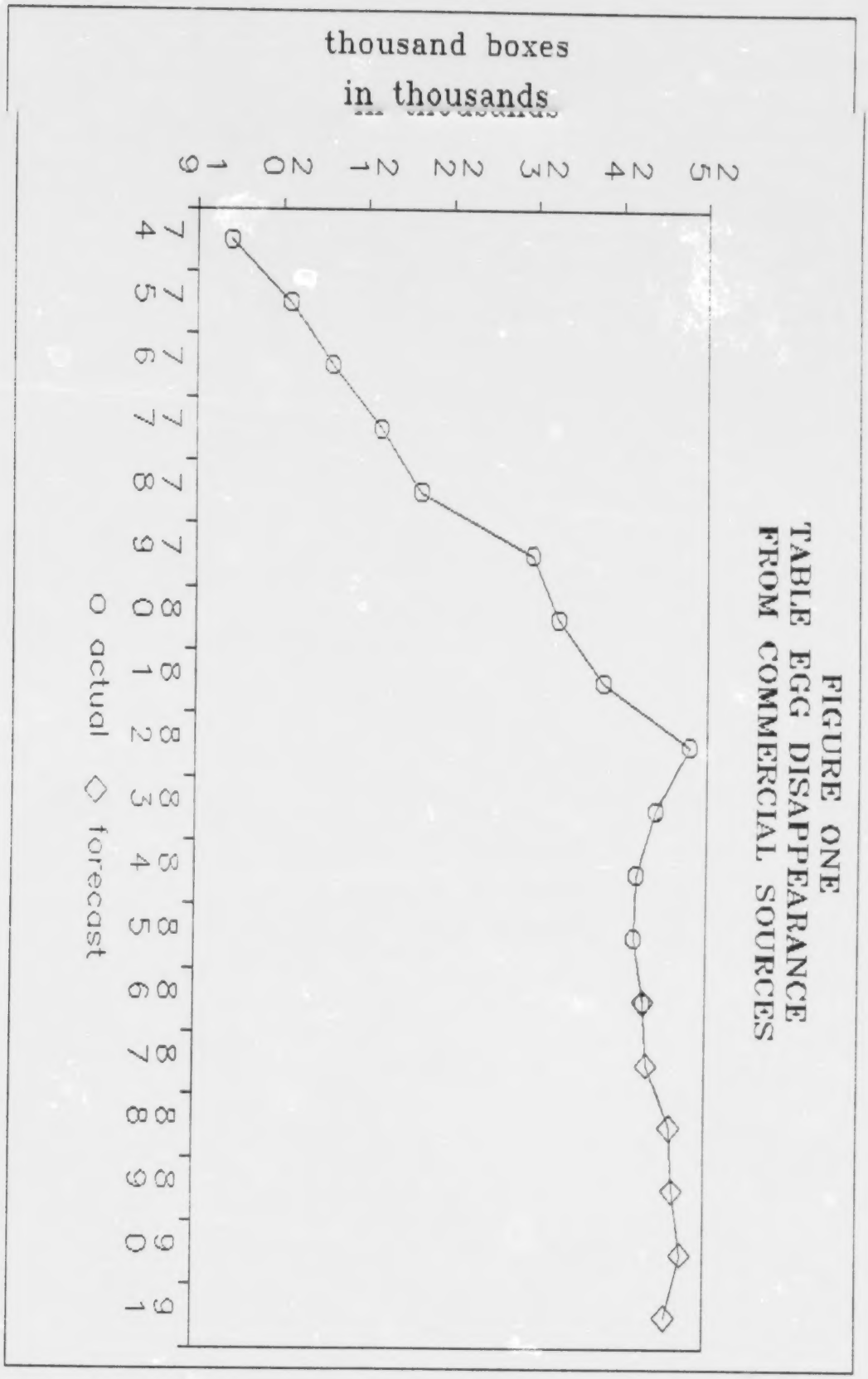
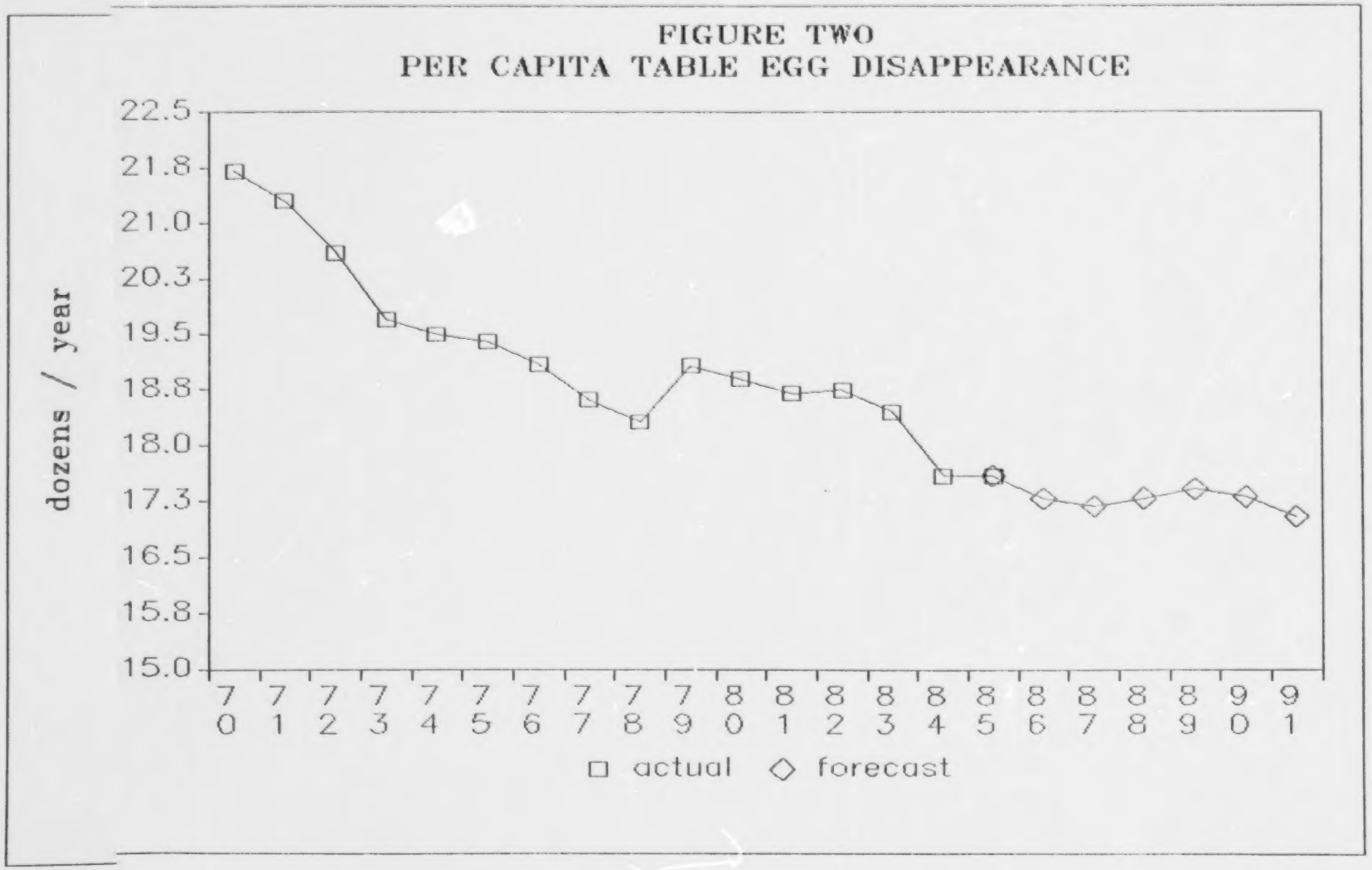


FIGURE ONE
TABLE EGG DISAPPEARANCE
FROM COMMERCIAL SOURCES

FIGURE TWO
PER CAPITA TABLE EGG DISAPPEARANCE



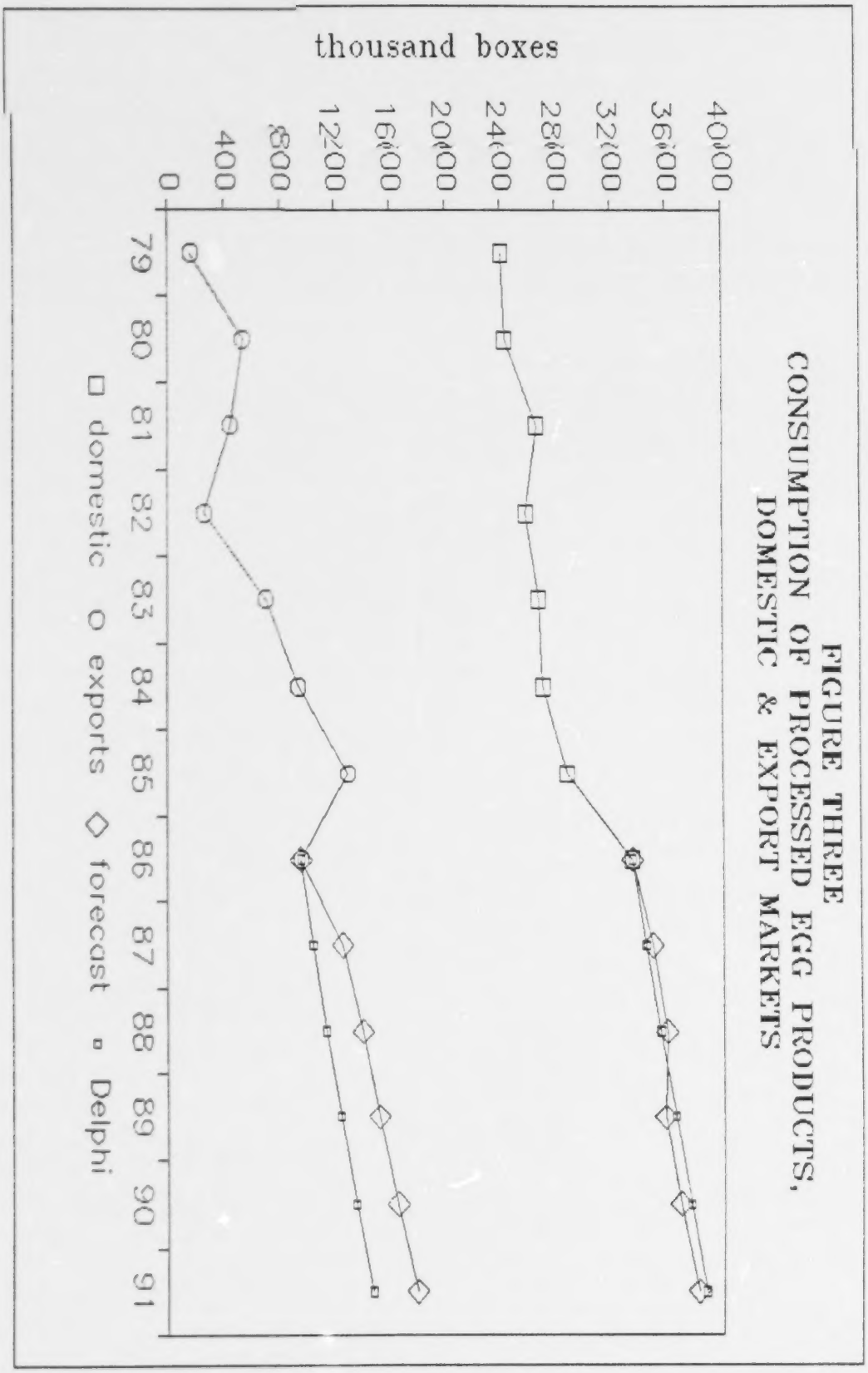


FIGURE THREE
CONSUMPTION OF PROCESSED EGG PRODUCTS, DOMESTIC & EXPORT MARKETS

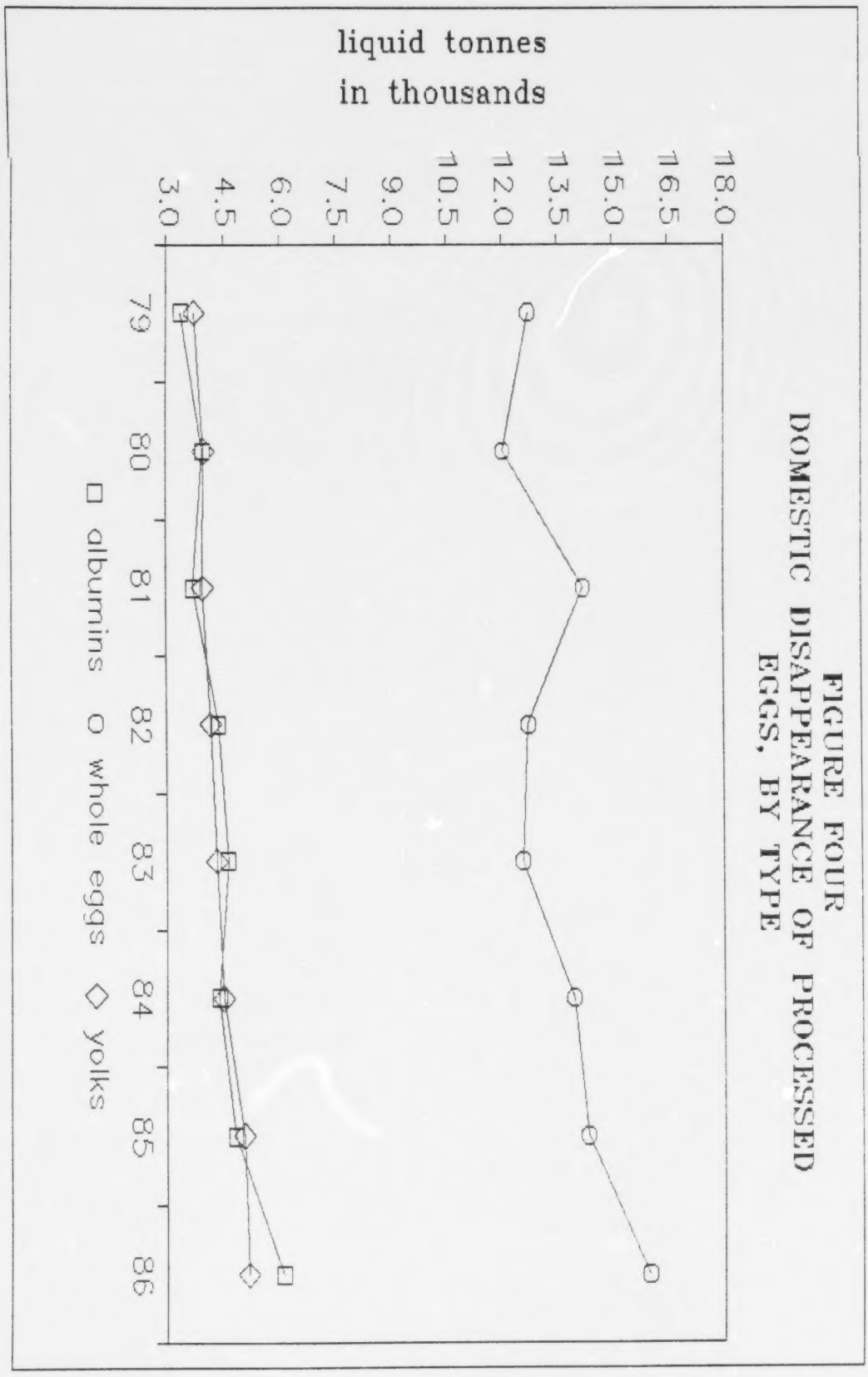


FIGURE FOUR
DOMESTIC DISAPPEARANCE OF PROCESSED EGGS, BY TYPE

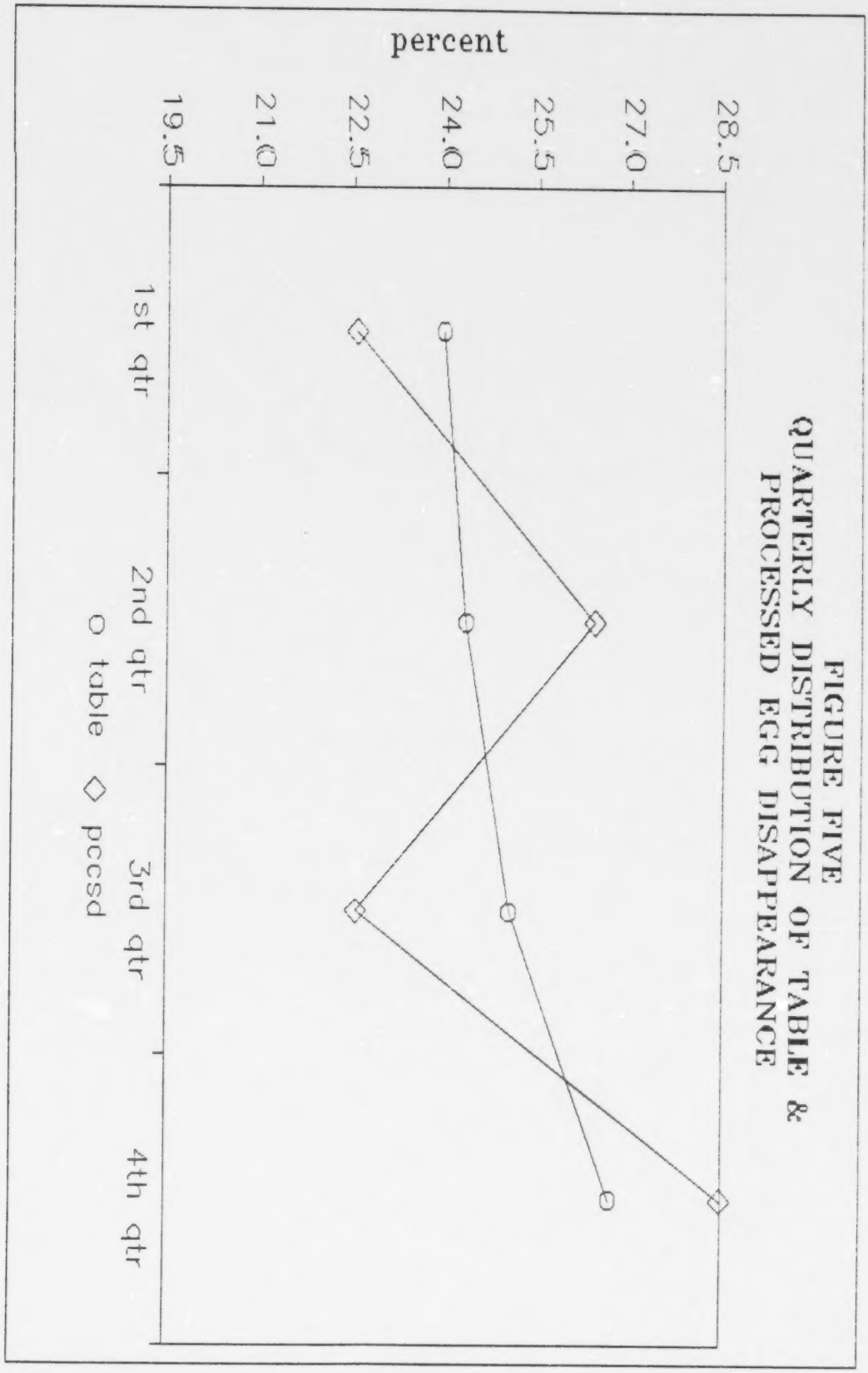


FIGURE FIVE
QUARTERLY DISTRIBUTION OF TABLE &
PROCESSED EGG DISAPPEARANCE

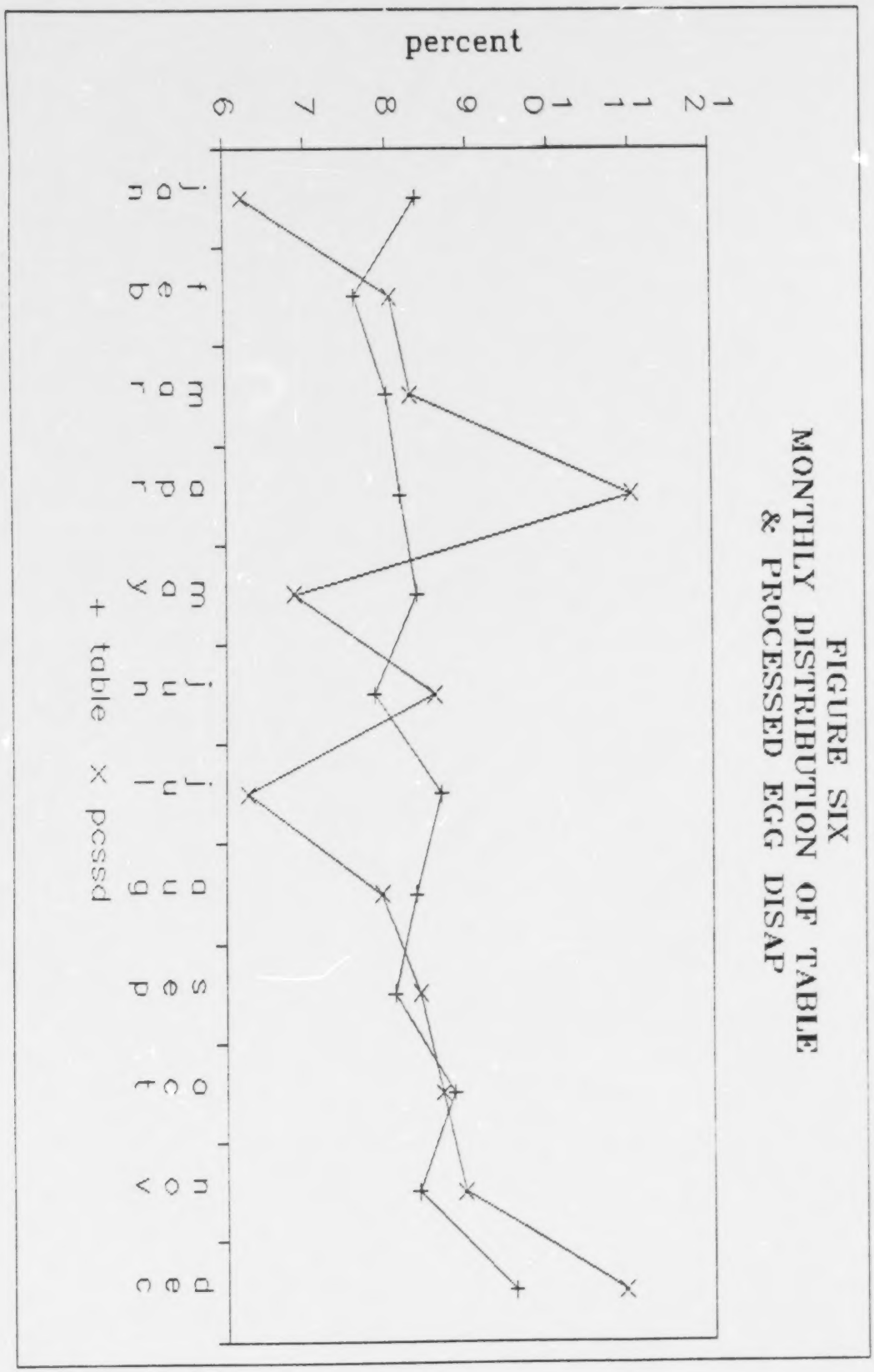


FIGURE SIX
MONTHLY DISTRIBUTION OF TABLE
& PROCESSED EGG DISAP

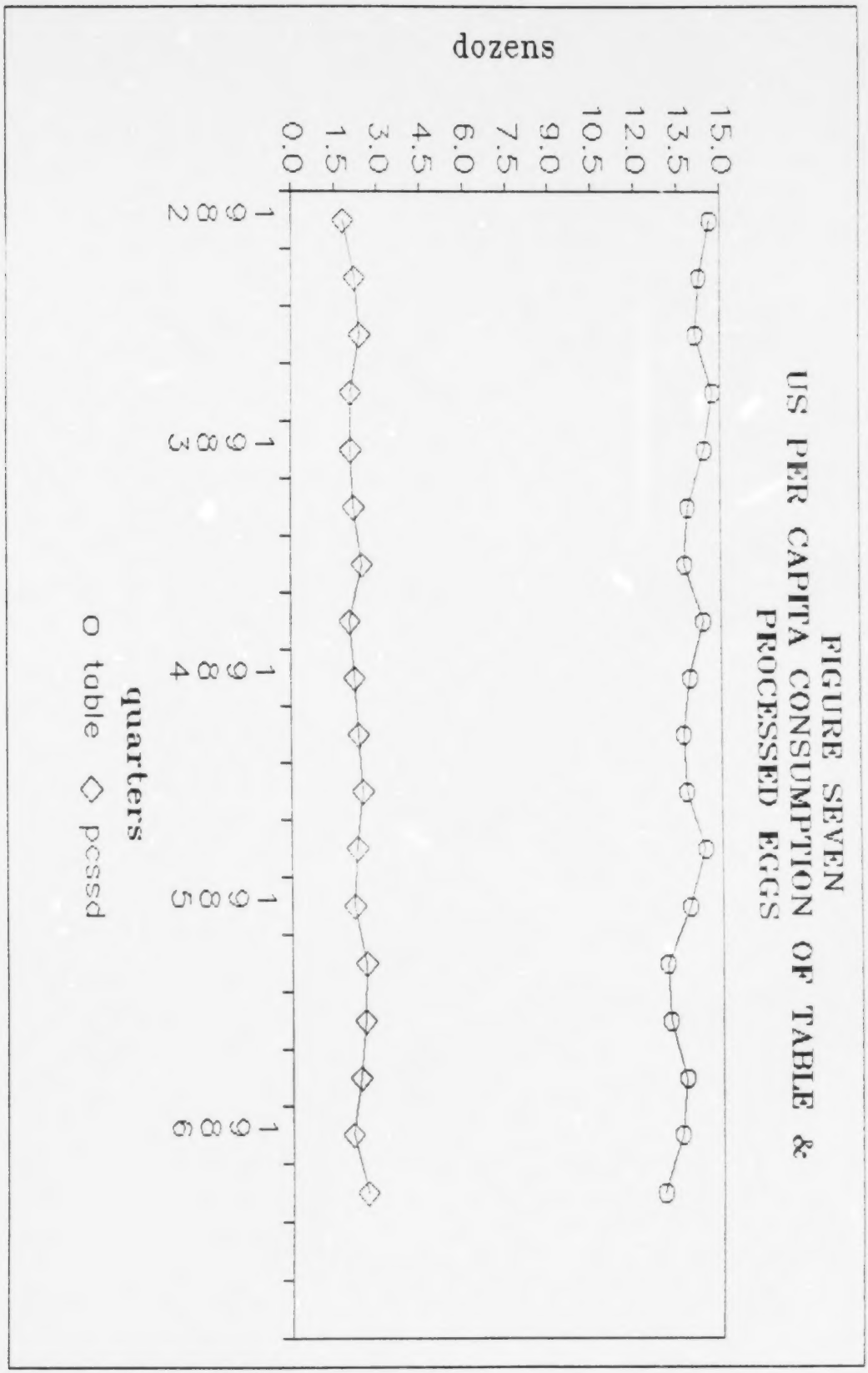


FIGURE SEVEN
US PER CAPITA CONSUMPTION OF TABLE & PROCESSED EGGS
dozens
15.0
13.5
12.0
10.5
9.0
7.5
6.0
4.5
3.0
1.5
0.0
1982
1983
1984
1985
1986
quarters
○ table ◇ pcssd

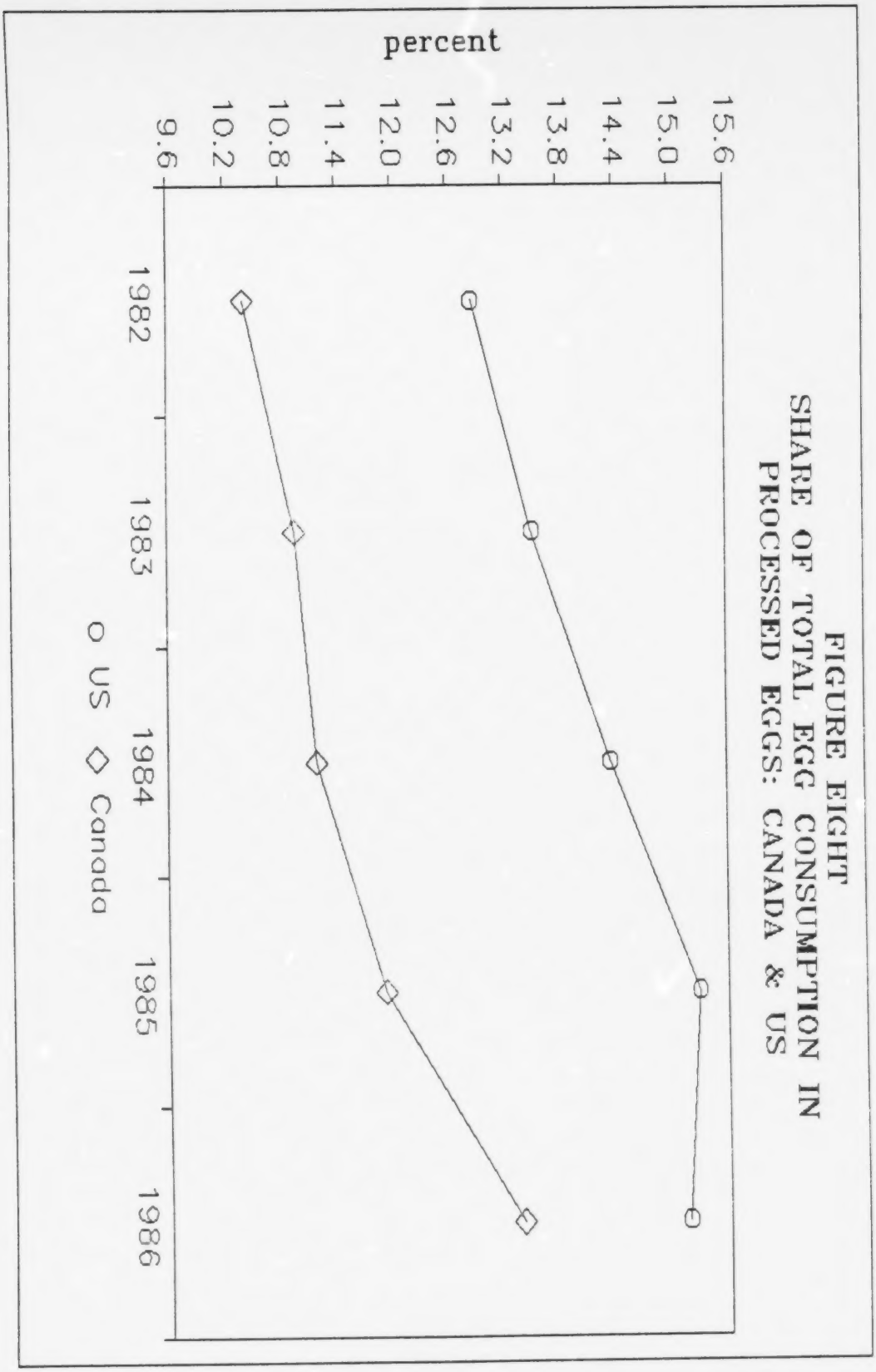


FIGURE EIGHT
SHARE OF TOTAL EGG CONSUMPTION IN
PROCESSED EGGS: CANADA & US

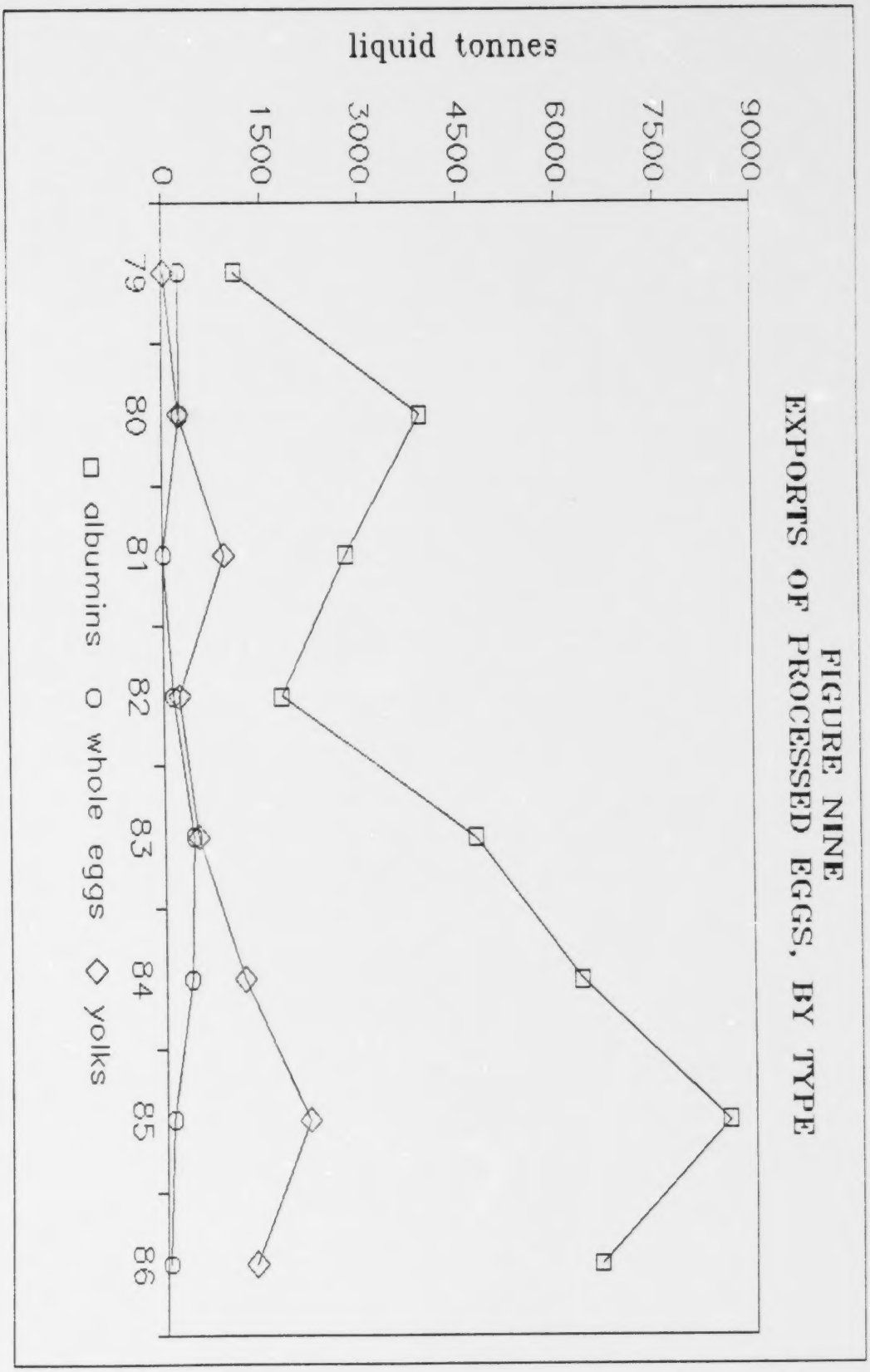


FIGURE NINE
EXPORTS OF PROCESSED EGGS, BY TYPE

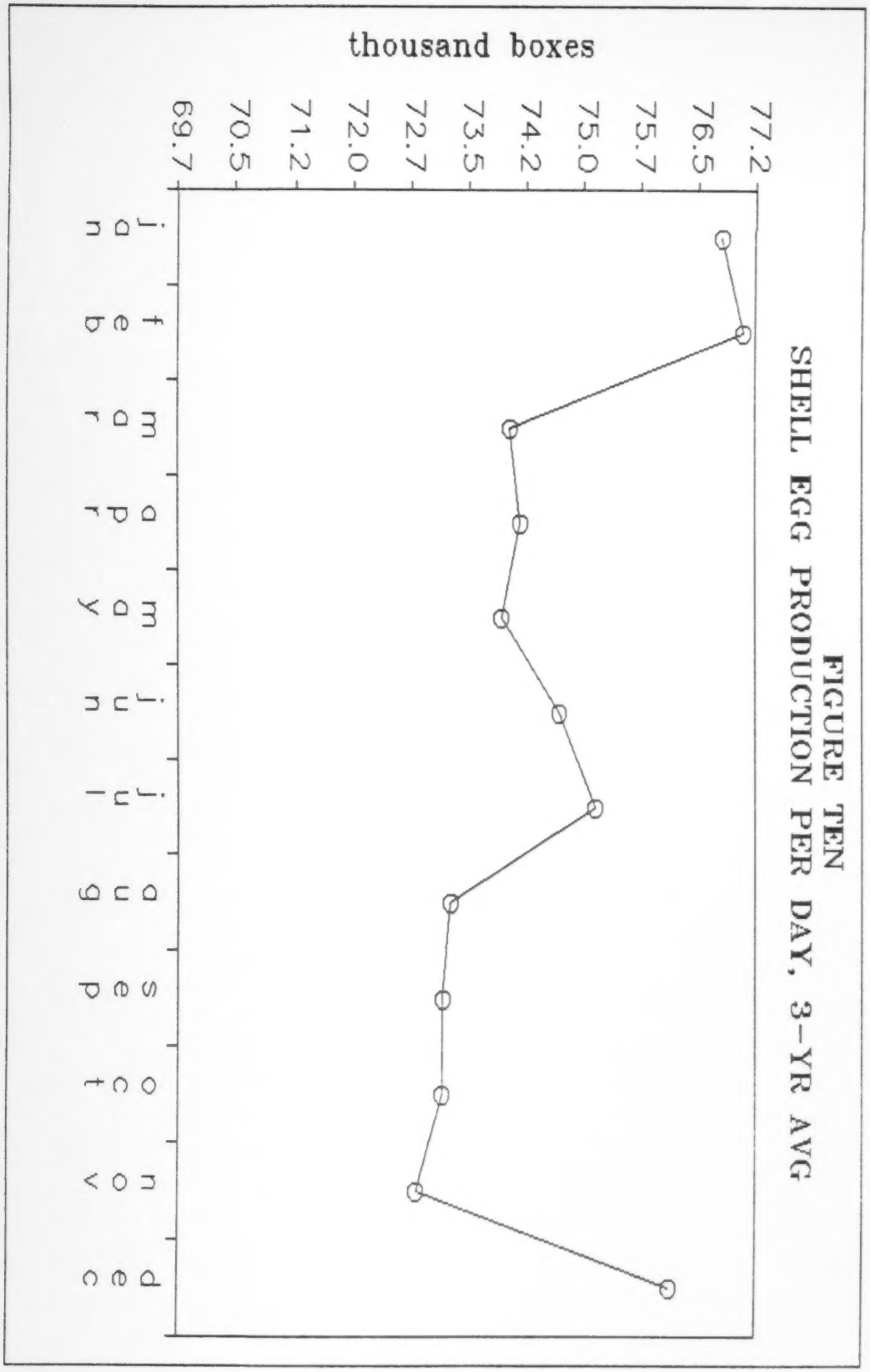


FIGURE TEN
SHELL EGG PRODUCTION PER DAY, 3-YR AVG
thousand boxes
77.2
76.5
75.7
75.0
74.2
73.5
72.7
72.0
71.2
70.5
69.7
j a n
f e b
m a r
a p r
m a y
j u n
j u l
a u g
s e p
o c t
n o v
d e c

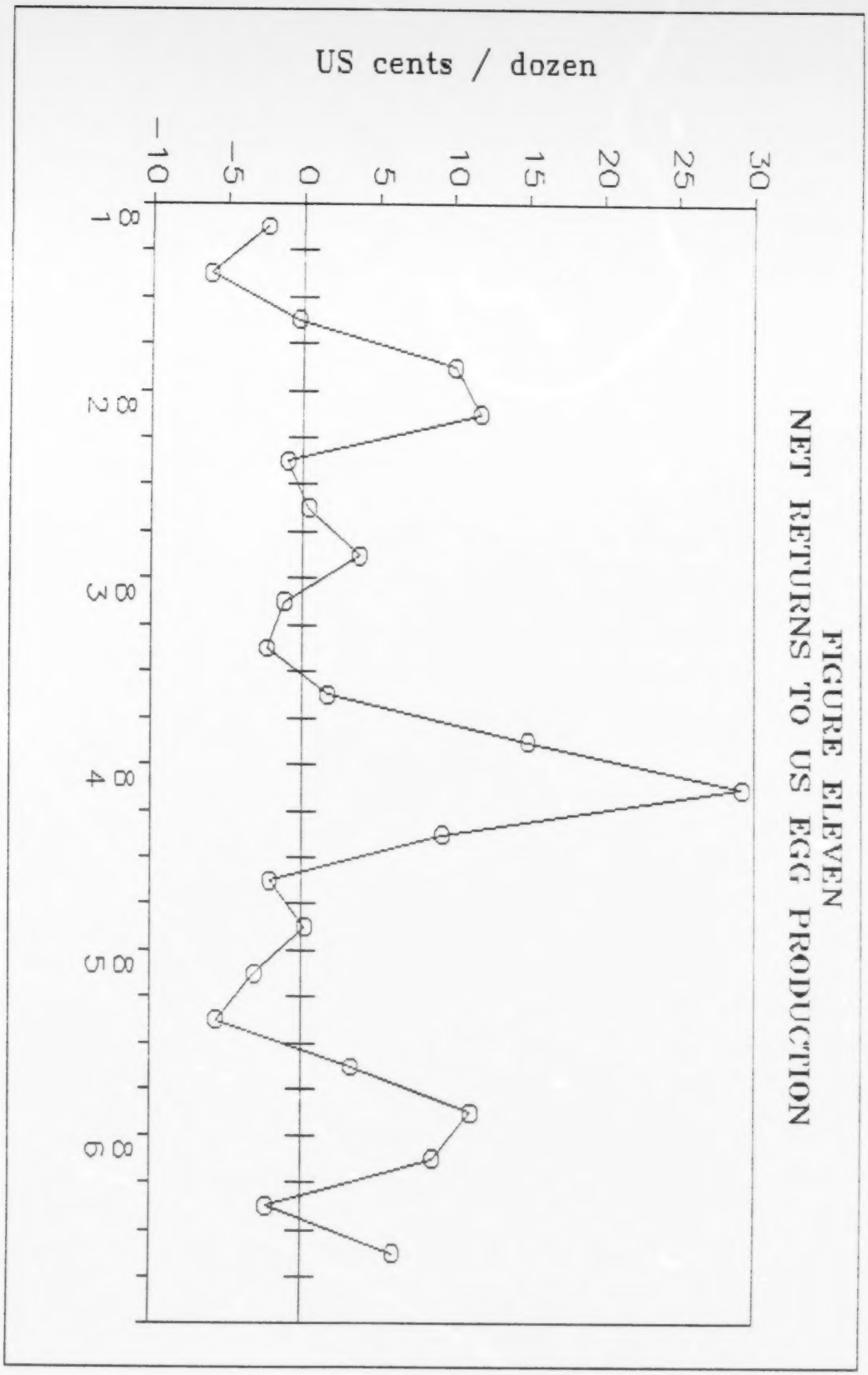


FIGURE ELEVEN
NET RETURNS TO US EGG PRODUCTION

FIGURE TWELVE
RECORD OF CANADIAN SURPLUS PRODUCTION
thousand boxes
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
1982
1983
1984
1985
1986
+ surplus × gradings □ table cn

FIGURE THIRTEEN
AVERAGE SURPLUS PRODUCTION, 84–86

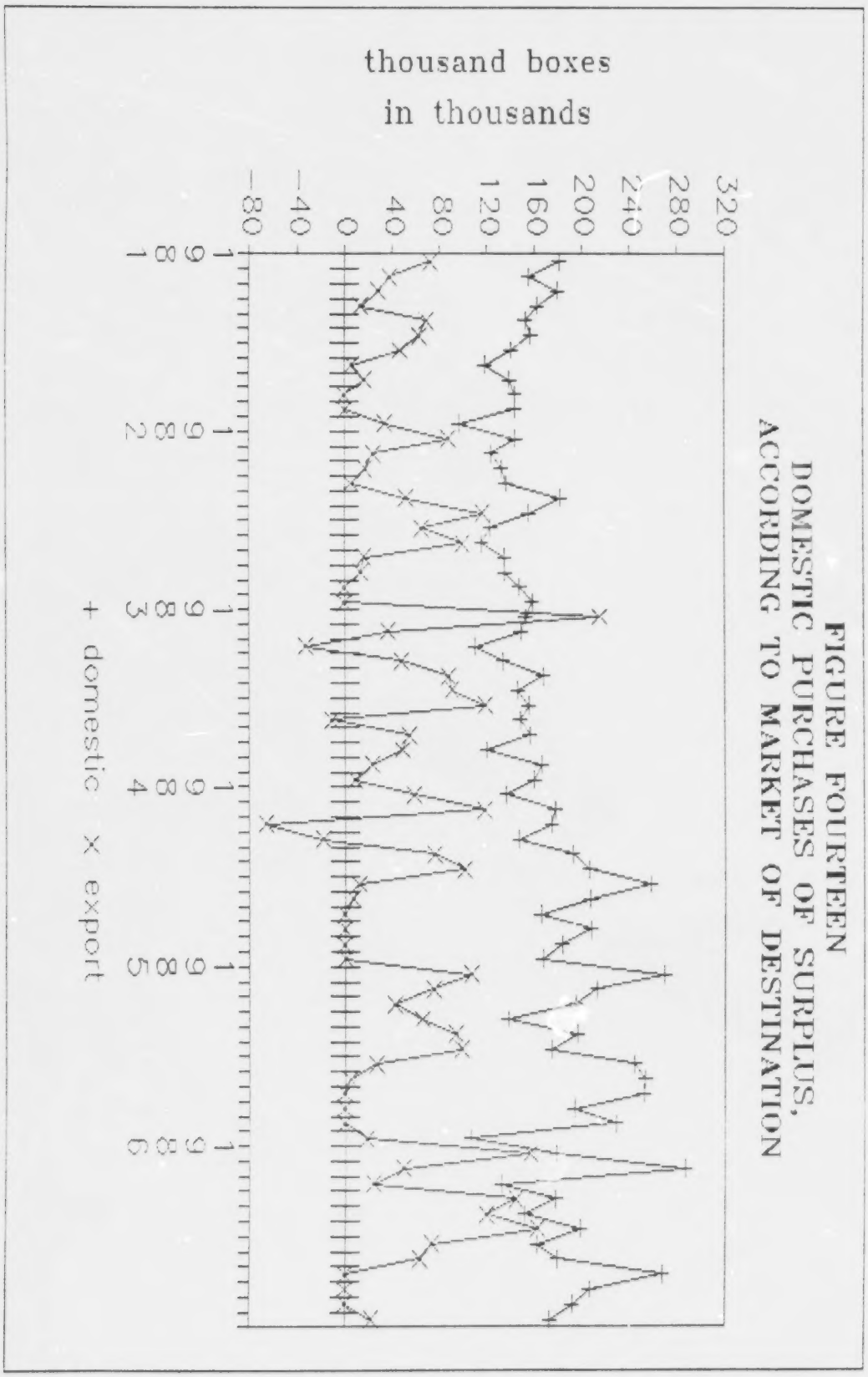


FIGURE FOURTEEN
DOMESTIC PURCHASES OF SURPLUS,
ACCORDING TO MARKET OF DESTINATION

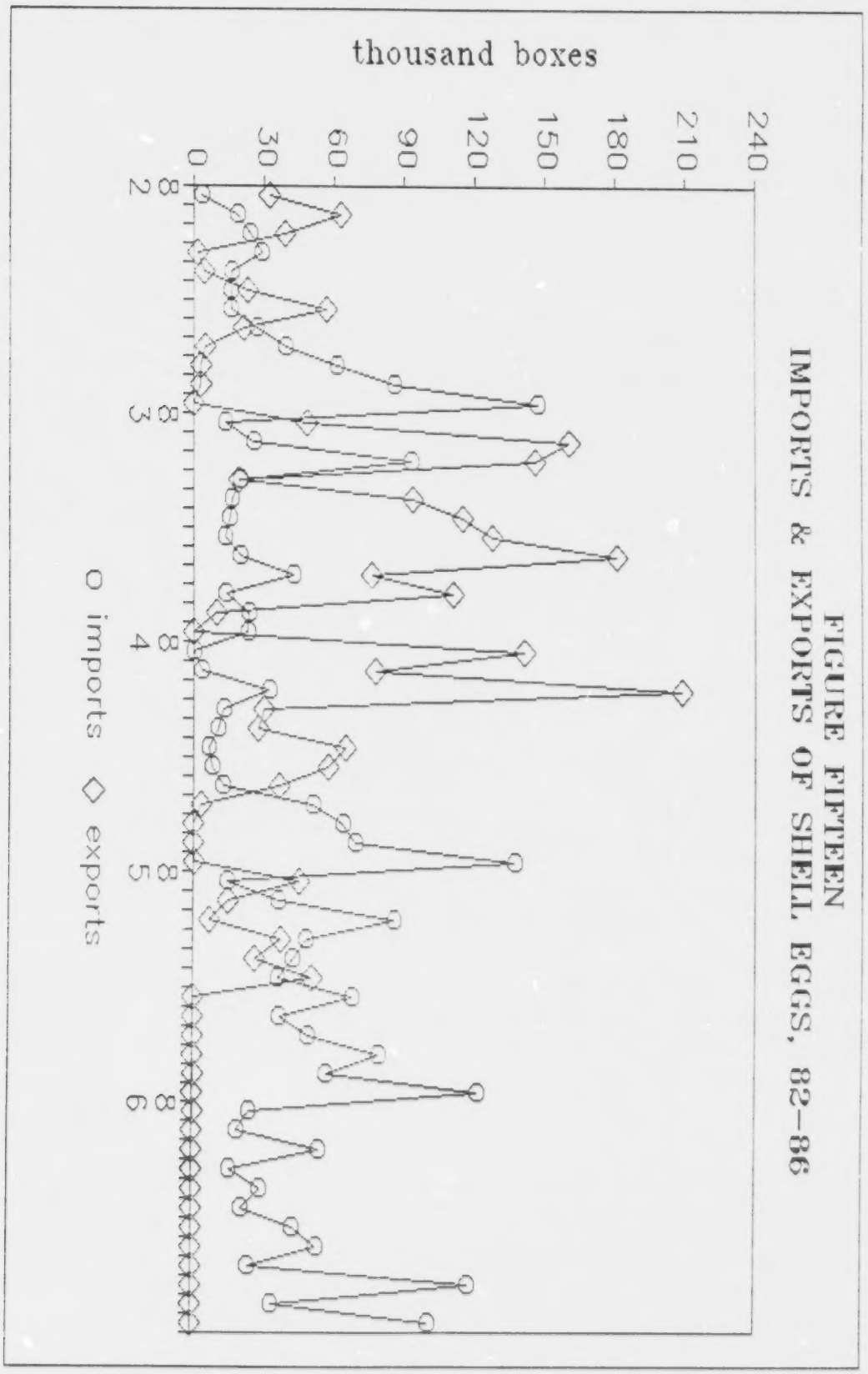
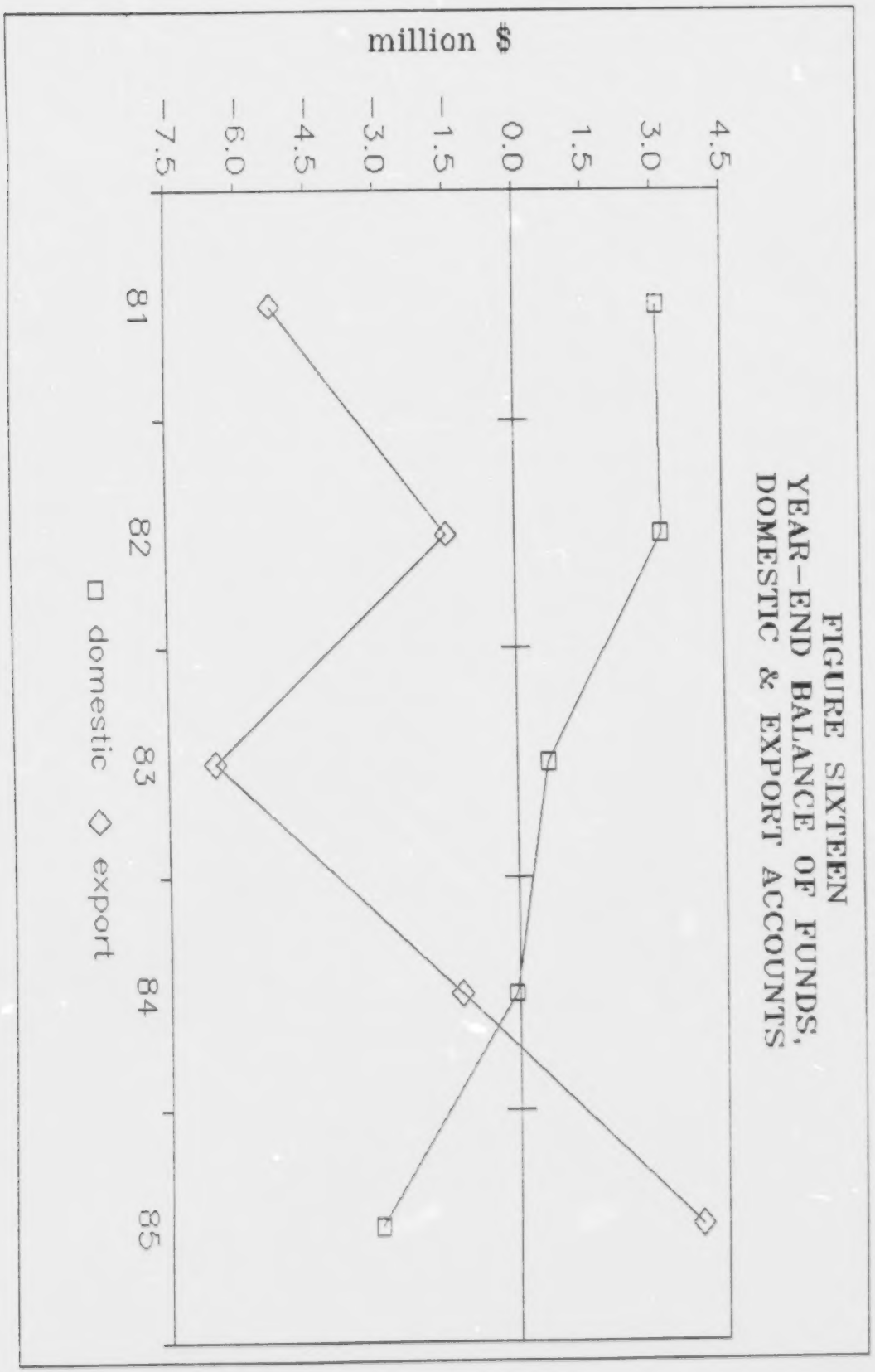


FIGURE FIFTEEN
IMPORTS & EXPORTS OF SHELL EGGS, 82–86

FIGURE SIXTEEN
YEAR-END BALANCE OF FUNDS,
DOMESTIC & EXPORT ACCOUNTS



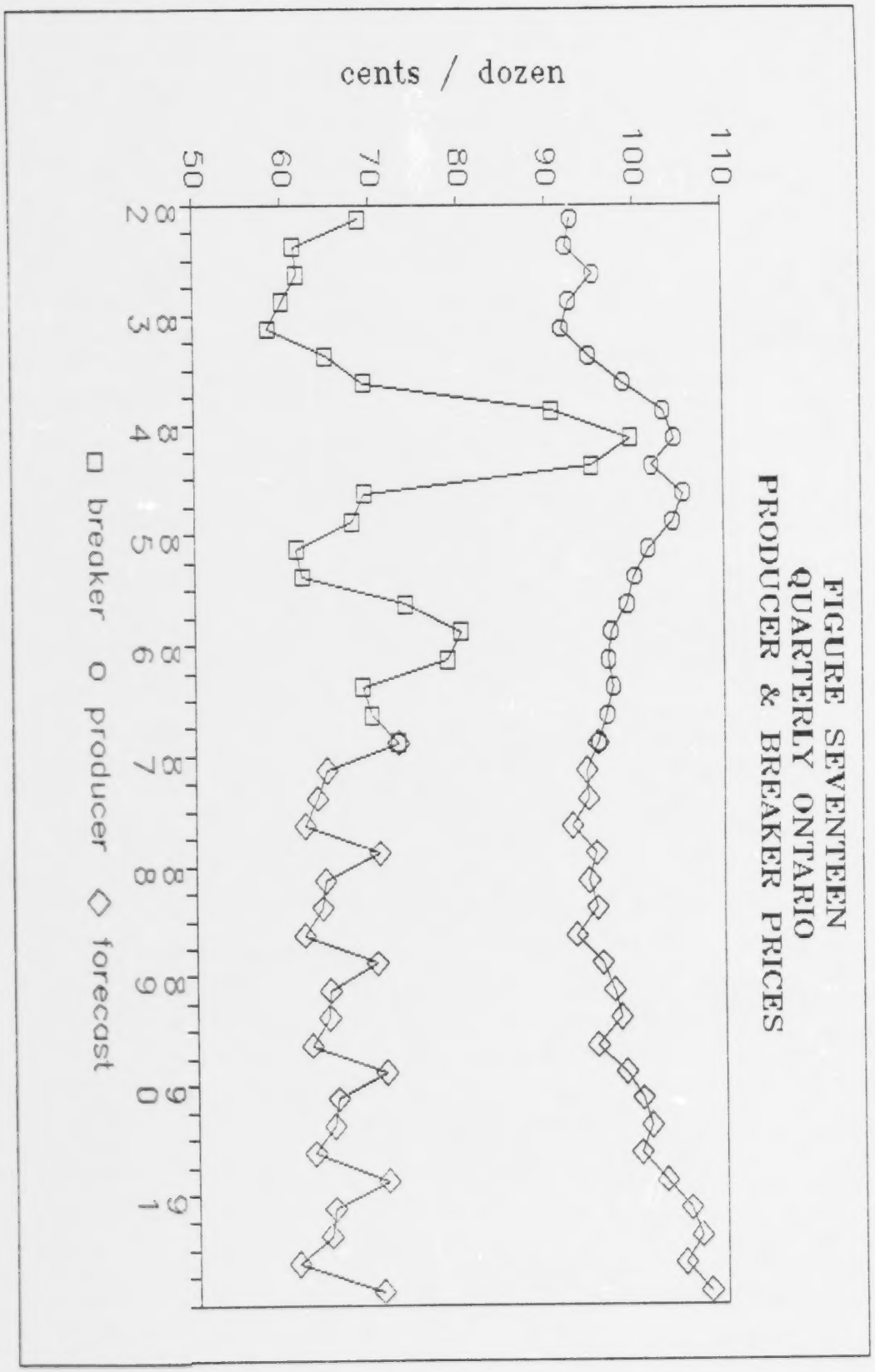


FIGURE SEVENTEEN
QUARTERLY ONTARIO
PRODUCER & BREAKER PRICES

V. FINANCING PRODUCTION AND SURPLUS: THE OPTIONS

1. Introduction

The objective of this study is the evaluation of the welfare impact for the consumer and producer sectors of alternate structures of domestic production, imports and surplus disposal financing in the egg industry. The procedure of this study is to establish and compare: first, alternative structures of domestic supply, and second, alternative sectoral assignments of surplus disposal financing. The alternative structures include alternative combinations of domestic shell egg production and imports of US shell eggs and processed egg products, to supply both the domestic table egg market, and domestic processor requirements for the domestic and export markets. The alternative sectoral assignments of surplus disposal financing represents the distribution among consumers and producers of the financing required to offset the pricing deficit on compensated sales of surplus shell eggs produced in the course of the routine supply of the table egg market. This chapter develops the policy options of the analysis. The options are listed in simplified form in the table following the chapter.

The analysis proceeds in the context of the model discussed in the third section of Chapter III. Hence this discussion will be limited to the presentation of the relevant options in the dependent variables: domestic production, and the levels of the consumer levy and of the producer and processor contributions. The results of each policy option will be compared with the results of the mid-term (five-year) forecast, which is merely the solution of the model without any imposed changes in policies. The mid-term forecast is referred to in the results with the mnemonic "FCST". The mid-term forecast assigns the producer contribution the responsibility for financing the sales of surplus eggs to the export markets, limits the consumer levy to its current level of 3.5 cents per dozen, and assigns the residual financing responsibility for sales of surplus eggs to the domestic markets to the processor contribution.

2. The Production Options

Three domestic production options will be examined. The definition of the three production options reflects alternate concepts of the level of domestic production required to satisfy the domestic table egg market. The first is the status quo: production in 1987 is set at the level of

quota granted for the year, and production in the following years is adjusted according to the change in domestic table egg disappearance in the preceding year. This option is referred to by the mnemonic "ACTL" for actual, or "A" for short. In the second option, production is set to exactly satisfy forecast table egg demand in the fourth quarter, the quarter of maximum table egg disappearance. In earlier quarters of the same year, production is set equal to the fourth-quarter level, with an adjustment in each quarter for the seasonal distribution of production over the four quarters. This option is referred to as "4Q".

The third option sets production at a level sufficient to both satisfy forecast fourth-quarter table egg demand, and to offset the usual level of supplemental imports in the fourth quarter. Supplemental imports are prima facie evidence of inadequate production, or of table egg requirements that were unfilled by the usual combination of domestic production and global imports of shell eggs. It is the position of Agriculture Canada not to endorse a level of domestic supply, including both domestic production and global imports, that ensures the existence of supplementary imports of table eggs. Supplemental import permits are intended to be issued only as a final recourse in the event of unusual and unpredictable market requirements. Hence domestic production must be set at a level to drive the usual supplemental imports of table eggs to zero. This option is referred to by the mnemonic "MKT", to reflect the effort to set production to satisfy all current table market requirements.

In the three years since the new weight categories were defined for A grade eggs in 1984, a substantial but fairly regular volume of A Large (AL) and A Extra-Large (AEL) supplemental imports have been brought in during the fourth quarter (see Chapter IV). These supplemental imports were required by irregular excessive table market requirements, resulting from weekly demand peaks caused by specialing, by supply insufficiencies resulting from regional product unavailability, and generally by the large shell egg stocks needed to satisfy seasonal holiday home baking and cooking requirements. The regularity of the AL and AEL supplemental imports over the three years from 1984 through 1986 suggests that the supply shortages and the weekly demand peaks will nct disappear, despite the fact that total quarterly domestic table egg production exceeded total quarterly table egg disappearance in the fourth quarter in each of the three years.

Supplemental imports result from an imbalance in the demand and supply of table eggs in a market that operates within a time frame of one to two weeks. However, the Agriculture Canada model operates on a quarterly basis, in which time period domestic production of table eggs always exceeds domestic consumption of table eggs. A quarterly model is simply incapable of targeting for demand peaks projected within a shorter time frame. Hence in order to capture the effect of planning production to offset the usual level of supplemental imports, it was necessary to add the usual level of supplemental imports to actual

production levels.

For the purposes of this study, the usual level of supplemental imports will be defined as the average level of fourth-quarter supplementaries over the three years from 1984 through 1986. The simple three-year average was selected, since three observations are insufficient to establish a trend, and in addition table egg disappearance is not expected to change relatively greatly over the horizon. The fourth quarter was selected since table egg consumption and supplemental imports of table eggs both peak in the fourth quarter.

However, these supplemental imports are AL and AEL eggs brought in to satisfy table market requirements. The level of domestic shell egg production required to offset these AL and AEL imports is greater than the level of imports, since domestic shell egg production is unavoidably a range of grades including the smaller and low-quality categories. Hence the additional volume of production must be adjusted to account for the distribution of grades. The adjustment was made on the basis of the distribution of grades in 1985, the most recent year for which final revised data exists. The average level of supplemental imports of AL and AEL eggs in the fourth quarter from 1984 through 1986 was 131.3 thousand boxes, and the adjusted volume of domestic production is 194.5 thousand boxes. This volume was added in each quarter to the level of production forecast according to actual quota allocation.

Under the first and third production options, surplus shell eggs are produced in each of the four quarters of the year. In the second option, surplus shell eggs are produced only in the first three quarters. In each quarter of the year, forecast domestic processed egg requirements, and forecast requirements of shell and processed eggs for subsequent processed egg exports, are supplied first from domestic surplus shell egg production. The residual requirements are supplied by imports of US shell and processed eggs. Total imports of US shell and processed eggs act as the residual variable in the model. Exports of processed eggs are fixed according to the forecasts of the Delphi survey, and exports of shell eggs are fixed at zero, as discussed above.

3. The Financing Options

The financing sub-options are designed to illustrate the maximum impact of disposal cost financing on the consumer and producer sectors under the three alternative production options. The first sub-option eliminates the producer contribution, and assigns full responsibility for disposal cost financing to the consumer levy. Hence the "consumer" levy (or the "domestic processing levy") will be responsible for financing the costs of disposal of all surplus shell eggs produced in the course of the routine supply of the table egg market, to both

domestic processors for the domestic market, and to domestic and foreign processors for the export markets. As mentioned in a previous chapter, this will impose considerably increased costs on the consumer levy, since sales of surplus for subsequent export are priced at the tendered price, much below the Urner-Barry formula price. This sub-option is identified by the mnemonic "ALL" or "A".

The second sub-option (identified by "NONE" or "N") eliminates the consumer levy, and assigns the producer contribution full financing responsibility for surplus disposal. The third financing sub-option (identified by "DOM" or "D") splits the costs of surplus disposal between the domestic and export markets, and assigns the consumer levy responsibility for the former and the producer contribution responsibility for the latter.

Finally, the study evaluated the impact of a 10% increase in the US farm price of eggs. Due to limited resources, the analysis was performed only with respect to the second production option (domestic production set equal to fourth-quarter table egg demand) and the third financing sub-option (consumer and producer levies responsible for the domestic and export markets).

TABLE ONE

THE OPTIONS

NAME	DOMESTIC PRODUCTION	CONSUMER LEVY	FINANCING PRODUCER CONTRIBTN	PROCESSOR CONTRBTN
ACTL-ALL	QUOTA	ALL SURPLUS	NONE	NONE
ACTL-NONE	QUOTA	NONE	ALL SURPLUS	NONE
ACTL-DOM	QUOTA	DOMESTIC SURPLUS SALES	EXPORT SURPLUS SALES	NONE
MKT-ALL	QUOTA + SUPPS	ALL SURPLUS	NONE	NONE
MKT-NONE	QUOTA + SUPPS	NONE	ALL SURPLUS	NONE
MKT-DOM	QUOTA + SUPPS	DOMESTIC SURPLUS SALES	EXPORT SURPLUS SALES	NONE
4Q-ALL	FOURTH QTR TABLE EGG DEMND	ALL SURPLUS	NONE	NONE
4Q-NONE	FOURTH QTR TABLE EGG DEMND	NONE	ALL SURPLUS	NONE
4Q-DOM	FOURTH QTR TABLE EGG DEMND	DOMESTIC SURPLUS SALES	EXPORT SURPLUS SALES	NONE

VI. FINANCING PRODUCTION AND SURPLUS: RESULTS

The task of this chapter is to present and discuss the welfare impacts of the selected alternative structures of supply and surplus disposal financing in the egg industry on the three industry sectors. These welfare impacts include: first, the volumes of production and consumption that are established in each sector, and the consequent requirements for supplementary imports to satisfy the forecast breaking stock demand of the processing sector; and second, the per dozen levy or contribution and the total level of financing required from each sector. The results of the modelling exercise are presented in the tables and figures attached at the end of the chapter.

The discussion explores in turn the welfare implications of the alternate structures of supply and surplus financing on, first, the consumer and second, the producer sectors. The welfare implications for consumers are summarized in only three tables. The first table presents the consequences of alternate industry structures for the per dozen annual weighted average of the consumer levy; the second presents the consequences for the annual total level of consumer financing; and the third, the consequences for annual total table egg disappearance. Similarly, the welfare implications for producers includes just two tables summarizing the implications for the annual weighted average producer contribution per dozen and the annual total producer contribution.

Each table includes seven columns: the first defines the results of the mid-term forecast, without any change in current policies; and the remaining six columns are grouped in three sets of two, with each group representing one of three production options. Only two financing options are included in any production option, corresponding to full payment by the sector (consumer or producer) for all costs of surplus disposal, or to payment for domestic or export market sales, as the case may be. Clearly there was no need to print the results of the third financing option for either sector: these results are identically zero.

Finally, the remaining two tables present the implications of the different structures of supply and surplus disposal financing for the annual domestic production of surplus shell eggs, and the corresponding requirements for imports of US shell and processed eggs to support the total forecast breaking stock requirements of the domestic processing sector. In addition, following several of the tables are secondary tables listing the absolute and percentage change in the subject (eg. consumer financing, surplus production), under each supply-financing

option, relative to the mid-term forecast. The seven figures following the tables graphically portray the results presented in the tables (nb. the software will graph only six series, and so the basecase mid-term forecast does not appear in the figures).

1. The Consumer Sector

Table one presents the annual weighted average of the consumer levy. Since the model solves on a quarterly basis, the results were weighted on the basis of the moving quarterly weights of table egg disappearance. The third column, listing the results for the Actual-Domestic option, indicates the forecast level of the consumer levy in each year of the planning horizon if the current quota allocation were maintained, the consumer levy was set to the level to offset the pricing deficit on sales of surplus to the domestic processed egg market only, and the current constraint of 3.5 cents/dozen was lifted. The results suggest that, under these conditions, the consumer levy would vary within a range of one-quarter cent from the current levy. Hence this study indicates that the current levy of 3.5 cents/dozen would be largely adequate to satisfy the requirements of deficit financing of sales of surplus shell eggs to the domestic market only over the five-year horizon.

The fourth column of table one lists the implications for the consumer levy of production at the current level and the consumer levy set to offset the pricing shortfall on all sales of surplus shell eggs, to both the domestic and export markets. The results suggest that the levy would rise to 7.6 cents/dozen in 1987. This is slightly higher than a cursory estimation of the consumer levy in the absence of the producer and processor contributions, which would add, respectively, two cents per dozen, and the equivalent of roughly two-tenths of one cent per dozen. However, the higher levy is explained by the reduction in table egg consumption that will result with a higher levy, and the corresponding requirement to slightly increase the levy to generate the funds required for surplus disposal. Over the five-year planning horizon, the consumer levy assigned the costs of financing the entire deficit, including exports, will average 8.2 cents/dozen.

These results also reflect the small error factor unavoidably built into the model. This entrenched error results from the inadequacy of available data to accurately reflect one crucial component of the egg industry, and the consequent necessity to fix one model variable according to the best possible independent forecast. The level of tendered sales of surplus eggs, intended for the export market, is only fairly accurately known months and perhaps years after the sale of the breaking stock. In fact, the available data describing the breakdown of surplus sales among commitment and tendered sales does not accurately

balance with the data describing domestic and export consumption of processed eggs. Hence this study was forced to fix exports according to the best industry forecast, derived through the Delphi process. Consequently, the consumer levy, or any other financing responsible for the costs of surplus disposal on the export markets, will show a slight rise in each year of the planning horizon, corresponding to the increasing forecast exports of processed eggs. Since exports of processed eggs are forecast to account for less than one-third of total use of domestic breaking stock, even in the final year of the planning horizon, and since the forecast of processed egg exports represents the consensus of the domestic processing sector, the results may be considered to demonstrate only a small margin of error. The outside limit of the error is discussed below; when the producer contribution is constrained to its current responsibility for exports of surplus shell eggs, the level it assumes reflects the predicted level of exports of processed eggs.

If domestic production is set at a level to drive usual fourth-quarter supplementary imports to zero, and the consumer levy is set to support surplus sales only to the domestic market, the consumer levy will be forced up on average 1.5 cents/dozen. This will offset the pricing shortfall on the additional surplus produced when annual domestic shell egg production rises by 778 thousand boxes. A similar effect on the consumer levy is observed, when the consumer levy supports surplus sales to both the domestic and export markets, and domestic production is raised to offset fourth-quarter supplementary imports. The consumer levy rises roughly 1.5 cents/dozen relative to its level when it is responsible for offsetting surplus sales to both disposal markets, and production is set at current quota.

When domestic production is set to the level of fourth-quarter table egg demand, and the consumer levy is restricted to financing surplus sales to the Canadian market, the consumer levy averages less than one-half its current level of 3.5 cents/dozen. When the consumer levy is assigned the responsibility for both markets, it falls to a range of one to two cents under the level it finds when domestic production is set according to current quota allocations. This implies roughly an equivalent fall of 2.3 cents/dozen in the two cases of surplus sales to either the domestic market only, or both the domestic and export markets.

With production set according to current quota and the consumer levy responsible only for the domestic market, the consumer levy is forecast to generate just over $15 million dollars in 1987, and on average just over $14 million dollars in each year of the planning horizon. If the consumer levy is assigned the responsibility of financing surplus disposal to both the domestic and export markets, the volume of financing will rise to an average $34 million per year.

If domestic productio is set to eliminate usual fourth-quarter

supplemental imports, the total volume of consumer sector financing will need to rise $6 million per year on average, relative to the consumer financing requirements with production set at current quota. Consumer financing must rise by an average $6 million when domestic production rises to include usual fourth-quarter supplementary imports, both when the consumer levy supports surplus sales to the domestic market only and when the levy offsets surplus disposal on both markets.

In contrast, the financing requirements for the consumer levy fall by an annual average of roughly $10 million, when domestic production is cut to the level of fourth-quarter table egg disappearance. Hence domestic production set to a level to fully satisfy weekly domestic table egg market requirements year-round, with the consumer levy set to offset surplus disposal to the domestic market only, is forecast to increase consumer sector financing by roughly 63% relative to the financing required with no change in policies. A drop in quarterly domestic production to the level of total fourth-quarter table egg demand will reduce consumer financing requirements by roughly 60%.

Table three and figure three present the implications for table egg disappearance of varying the levels of domestic production and the financing responsibility of the consumer levy. The figure illustrates clearly that no significant impact on table egg disappearance manifests as a result of changes in the level of the consumer levy. The secondary tables within table three reinforce this conclusion. An annual average drop in total disappearance of only one-half a percent is forecast in the most extreme case: domestic production is raised to the level to offset supplementary imports and the consumer levy is set to finance the deficit on all sales of surplus to both the domestic and export markets. In contrast, if the consumer levy falls to less than one-half its current level, as predicted with domestic production set to fourth-quarter table egg demand and the levy constrained to financing just domestic surplus sales, then table egg disappearance is forecast to rise no more than an annual average of one-fifth of one percent.

2. The Producer Sector

Tables four and five and figures four and five present the results of assigning some degree of responsibility for deficit financing to producers. Columns two and three of table four present the levels of the producer contribution if domestic production is set no different from the current allocation of quota. Full deficit financing for all surplus sales would require a producer contribution of 6.7 cents/dozen in 1987, more than double the current level; over the five-year planning horizon, the required producer contribution would average 7.3 cents/dozen. In contrast, if the producer contribution is restricted to the export market, the rate rises only to 2.5 cents/dozen in 1987, and

averages only 3.3 cents per dozen per year over the planning horizon.

This reflects a rise of only two cents per dozen in total over the five-year planning horizon, and on average just under one-half cent per dozen per year. As suggested above, this rise of just under one half-cent per dozen per year provides an outside estimate of the small error built into the model. To the degree that exports of processed eggs derived from surplus shell eggs do in fact keep pace with the forecasts of the Delphi survey, the producer levy will rise at the predicted pace.

The producer contribution hardly changes when it is assigned to offsetting surplus costs on export sales, regardless of the production alternative. However, when producers agree to finance all sales of surplus shell eggs, and production is set to the level of fourth-quarter disappearance, the producer contribution falls roughly two cents/dozen below the level set when domestic production is set according to current quota. When domestic production is set to offset fourth-quarter table egg demand plus supplemental imports, and producers are financing surplus disposal to both the domestic and export markets, the producer contribution rises an average of roughly one cent per dozen per year.

With production set at the level of current quota, and producers responsible for financing surplus sales only to export markets, the producer contribution rises to 4.4 cents per dozen over the five years of the planning horizon. This is just over double its 1987 (two cents/dozen) rate. Total producer funding rises correspondingly, to $18 million from $8 million. The total cost to producers is less than the total cost to consumers whenever either sector is entirely responsible for the deficit generated by all sales of surplus to both markets. The difference in every case is roughly $6 million. The difference results from the increased level of egg consumption which results when the consumer levy is set to zero. This increased consumption supports a greater volume of egg production against which producers calculate their per dozen payments.

3. Surplus Production and US Imports

Table six and figure six present the total volume of surplus shell egg production under each of the six study scenarios, as well as the volume of surplus with the continuation of the current structure of production and financing. As expected, the volume of surplus generated with domestic production fixed according to current quota, regardless of the level of the consumer levy, hardly differs from the volume of surplus expected under the mid-term forecast, with no change from current production and financing conditions. Similarly, when domestic production is set to drive supplementary imports to zero, the volume of

surplus generated increases by roughly the increase in the annual level of production, regardless of the structure of financing. When domestic production is set equal to fourth-quarter table egg demand, the volume of surplus generated falls by 15% and 32% relative to the mid-term forecast, when the consumer levy is set to offset the deficit in the domestic market or in both the domestic and export markets, respectively.

The implications of these results are demonstrated in Table seven and in figure seven. This table and figure present the forecast imports of both shell and processed eggs, in shell equivalent form. The mid-term forecast defines the level of shell and processed egg imports required to satisfy the requirements of the domestic processing sector for breaking stock, according to the growth in the domestic and export markets for processed eggs forecast by the Delphi survey, and assuming that the structure of domestic production and financing remains stable. The mid-term forecast suggests that shell and processed egg imports may have to rise by two and one-half times over the five-year planning horizon, at an average annual rate of increase of roughly 300 thousand boxes of shell egg equivalents.

Naturally, when domestic production is fixed according to current quota, shell and processed egg imports hardly change from the mid-term forecast, regardless of the level of the consumer levy. However, any small shift in domestic production has a significant impact on import requirements. Raising domestic production to the level to end supplementary imports is forecast to reduce shell and processed egg imports by over 40% on an annual average basis. The drop in processed and shell egg import requirements ranges from 30% - 60% below the expectations of the mid-term forecast, over the five years of the planning horizon, regardless of whether the consumer levy is assigned the responsibility for financing surplus disposal to one or both processed egg markets. In contrast, reducing domestic production to the level of fourth-quarter table egg demand increases shell and processed egg import requirements by an annual average 41% - 47%, according to whether the consumer levy is responsible for surplus disposal to both the domestic and export markets, or strictly to the domestic market.

TABLE ONE

CONSUMER LEVY: ANNUAL WEIGHTED AVERAGE, CENTS/DOZ

	fcst	actl-all	actl-dom	mkt-all	mkt-dom	4q-all	4q-dom
1986	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1987	3.50	7.56	3.65	9.05	5.14	5.32	1.27
1988	3.50	8.15	3.75	9.63	5.23	6.30	1.43
1989	3.50	7.64	3.09	9.13	4.58	6.79	1.39
1990	3.50	8.05	2.96	9.53	4.45	7.17	1.02
1991	3.50	9.64	3.54	11.12	5.02	8.21	0.88
avg	3.50	8.21	3.40	9.69	4.88	6.76	1.20

TABLE TWO

CONSUMER LEVY FUNDING, ANNUAL TOTAL, MILLION $

	fcst	actl-all	actl-dom	mkt-all	mkt-dom	4q-all	4q-dom
1986	12.74	12.743	14.313	12.743	12.743	12.743	12.743
1987	12.62	31.265	15.194	38.385	21.853	21.218	5.334
1988	12.68	33.890	15.689	41.110	22.391	25.558	6.149
1989	12.93	31.913	13.072	39.085	19.708	28.133	6.152
1990	12.98	33.521	12.494	40.740	19.116	29.565	4.627
1991	12.89	40.069	14.885	47.476	21.575	33.556	4.045
avg	12.82	34.13	14.27	41.36	20.93	27.61	5.26

percentage change relative to the current mid-term forecast

1986	-	0.00	12.32	0.00	0.00	0.00	0.00
1987	-	147.79	20.42	204.22	73.20	68.16	-57.72
1988	-	167.25	23.72	224.19	76.58	101.55	-51.51
1989	-	146.76	1.08	202.21	52.38	117.52	-52.43
1990	-	158.15	-3.78	213.75	47.22	127.69	-64.37
1991	-	210.91	15.50	268.38	67.41	160.37	-68.62
avg	-	166.17	11.39	222.55	63.36	115.06	-58.93

absolute change relative to the current mid-term forecast

1986	-	0.00	1.57	0.00	0.00	0.00	0.00
1987	-	18.65	2.58	25.77	9.24	8.60	-7.28
1988	-	21.21	3.01	28.43	3.71	12.88	-6.53
1989	-	18.98	0.14	26.15	6.77	15.20	-6.78
1990	-	20.54	-0.49	27.76	6.13	16.58	-8.36
1991	-	27.18	2.00	34.59	8.69	20.67	-8.84
avg	-	21.31	1.45	28.54	8.11	14.79	-7.56

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avg	-	21.31	1.45	28.54	8.11	14.79	-7.56

TABLE THREE

TABLE EGG DISAPPEARANCE, ANNUAL TOTAL, '000 BXS

	actl-all	actl-dom	mkt-all	mkt-dom	4q-all	4q-dom
1986	24273	24273	24273	24273	24273	24273
1987	23940	24025	23907	23993	23986	24074
1988	24047	24146	24014	24114	24088	24198
1989	24539	24640	24507	24608	24559	24679
1990	24634	24743	24602	24711	24653	24785
1991	24421	24546	24388	24513	24450	24601

percentage change relative to the current mid-term forecast

1986	-	0.00	0.00	0.00	0.00	0.00	0.00
1987	-	-0.39	-0.04	-0.53	-0.17	-0.20	0.17
1988	-	-0.44	-0.03	-0.58	-0.17	-0.27	0.18
1989	-	-0.39	0.02	-0.52	-0.11	-0.31	0.18
1990	-	-0.40	0.04	-0.53	-0.09	-0.32	0.21
1991	-	-0.52	-0.01	-0.65	-0.14	-0.40	0.22
avg	-	-0.43	0.00	-0.56	-0.14	-0.30	0.19

absolute change relative to the current mid-term forecast

1986	-	0.00	0.00	0.00	0.00	0.00	0.00
1987	-	-94.19	-8.51	-126.63	-40.95	-47.21	40.52
1988	-	-107.26	-7.53	-139.70	-39.97	-65.91	43.67
1989	-	-95.60	5.81	-128.04	-26.63	-75.39	44.21
1990	-	-99.11	9.96	-131.55	-22.48	-79.76	51.48
1991	-	-126.77	-2.03	-159.21	-34.47	-97.25	53.11
avg	-	-104.59	-0.46	-137.03	-32.90	-73.10	46.60

TABLE FOUR

PRODUCER CONTRIBUTION: ANNUAL WEIGHTED AVERAGE, CENTS/DOZ

	fcst	actl-none	actl-dom	mkt-none	mkt-dom	4q-none	4q-dom
1986	2.25	2.25	2.25	2.25	2.25	2.25	2.25
1987	2.00	6.74	2.47	7.79	2.40	4.51	2.58
1988	2.00	7.19	2.82	8.23	2.74	5.05	2.91
1989	2.00	6.83	3.17	7.94	3.08	5.32	3.22
1990	2.00	7.18	3.69	8.37	3.58	5.51	3.74
1991	2.00	8.42	4.40	9.75	4.28	6.11	4.51
avg	2.00	7.27	3.31	8.42	3.22	5.30	3.39

TABLE FIVE

PRODUCER CONTRIBUTION FUNDING, ANNUAL TOTAL, MILLION $

	fcst	actl-none	actl-dom	mkt-none	mkt-dom	4q-none	4q-dom
1986	9.20	9.195	9.195	9.195	9.195	9.195	9.195
1987	8.15	27.476	10.063	32.660	10.063	17.603	10.063
1988	8.20	29.447	11.546	34.705	11.546	19.994	11.546
1989	8.21	28.025	13.010	33.495	13.010	21.504	13.010
1990	8.21	29.457	15.132	35.342	15.132	22.261	15.132
1991	8.21	34.589	18.083	41.181	18.083	24.503	18.083
avg	8.20	29.80	13.57	35.48	13.57	21.17	13.57

percentage change relative to the current mid-term forecast

1986	-	0.00	0.00	0.00	0.00	0.00	0.00
1987	-	236.96	23.41	300.53	23.41	115.87	23.41
1988	-	259.32	40.88	323.47	40.88	143.96	40.88
1989	-	241.47	58.52	308.13	58.52	162.02	58.52
1990	-	258.79	84.31	330.46	84.31	171.14	84.31
1991	-	321.25	120.23	401.53	120.23	198.41	120.23
avg	-	263.56	65.47	332.82	65.47	158.28	65.47

absolute change relative to the current mid-term forecast

1986	-	0.00	0.00	0.00	0.00	0.00	0.00
1987	-	19.32	1.91	24.51	1.91	9.45	1.91
1988	-	21.25	3.35	26.51	3.35	11.80	3.35
1989	-	19.82	4.80	25.29	4.80	13.30	4.80
1990	-	21.25	6.92	27.13	6.92	14.05	6.92
1991	-	26.38	9.87	32.97	9.87	16.29	9.87
avg	-	21.60	5.37	27.28	5.37	12.98	5.37

TABLE SIX

SURPLUS SHELL EGG PRODUCTION
'ØØØ bxs

	fcst	actl-all	actl-dom	mkt-all	mkt-dom	4q-all	4q-dom
1986	3523	3524	3524	3524	3524	3524	3524
1987	37ØØ	3794	3657	4535	4398	2738	226Ø
1988	3885	3993	3836	4734	4577	3128	2537
1989	3477	3571	3414	4312	4155	3198	2593
199Ø	3388	3487	332Ø	4228	4Ø61	3124	2471
1991	3584	3711	353Ø	4452	4271	3143	2429
avg	36Ø7	3711	3551	4452	4292	3Ø67	2458

absolute change relative to the current mid-term forecast

1986	-	Ø.62	Ø.62	Ø.62	Ø.62	Ø.62	Ø.62
1987	-	94.ØØ	-43.ØØ	835.ØØ	698.ØØ	-961.59	-1,439.53
1988	-	1Ø8.ØØ	-49.ØØ	849.ØØ	692.ØØ	-756.53	-1,348.15
1989	-	94.ØØ	-63.ØØ	835.ØØ	678.ØØ	-278.91	-884.17
199Ø	-	99.ØØ	-68.ØØ	84Ø.ØØ	673.ØØ	-263.83	-917.25
1991	-	127.ØØ	-54.ØØ	868.ØØ	687.ØØ	-44Ø.52	-1,154.81
avg	-	1Ø4.4Ø	-55.4Ø	845.4Ø	685.6Ø	-54Ø.28	-1,148.78

percentage change relative to the current mid-term forecast

1986	-	Ø.Ø2	Ø.Ø2	Ø.Ø2	Ø.Ø2	Ø.Ø2	Ø.Ø2
1987	-	2.54	-1.16	22.57	18.86	-25.99	-38.91
1988	-	2.78	-1.26	21.85	17.81	-19.47	-34.7Ø
1989	-	2.7Ø	-1.81	24.Ø1	19.5Ø	-8.Ø2	-25.43
199Ø	-	2.92	-2.Ø1	24.79	19.86	-7.79	-27.Ø7
1991	-	3.54	-1.51	24.22	19.17	-12.29	-32.22
avg	-	2.9Ø	-1.55	23.49	19.Ø4	-14.71	-31.67

TABLE SEVEN

IMPORTS OF SHELL & PROCESSED EGGS
'000 bxs

	fcst	actl-all	actl-dom	mkt-all	mkt-dom	4q-all	4q-dom
1986	1071	1071	1071	1071	1071	1071	1071
1987	1477	1417	1449	586	557	2588	2626
1988	1576	1491	1562	698	670	2544	2619
1989	2128	2152	2234	1370	1342	2543	2791
1990	2459	2479	2574	1710	1682	3129	3166
1991	2592	2591	2699	1835	1807	3156	3427
avg	2046	2026	2104	1240	1212	2792	2926

absolute change relative to the current mid-term forecast

1986	-	0.00	0.00	0.00	0.00	0.00	0.00
1987	-	-60.44	-27.80	-891.54	-919.84	1,111.07	1,149.01
1988	-	-84.84	-13.84	-877.58	-905.88	968.29	1,043.58
1989	-	23.79	105.79	-757.96	-786.25	415.06	662.55
1990	-	20.19	115.19	-748.55	-776.85	670.68	707.84
1991	-	-0.80	107.20	-756.54	-784.84	564.10	834.59
avg	-	-20.42	57.31	-806.44	-834.73	745.84	879.51

percentage change relative to the current mid-term forecast

1986	-	0.00	0.00	0.00	0.00	0.00	0.00
1987	-	-4.09	-1.88	-60.35	-62.27	75.21	77.78
1988	-	-5.38	-0.88	-55.69	-57.49	61.45	66.22
1989	-	1.12	4.97	-35.62	-36.95	19.50	31.13
1990	-	0.82	4.69	-30.45	-31.60	27.28	28.79
1991	-	-0.03	4.14	-29.19	-30.28	21.76	32.20
avg	-	-1.51	2.21	-42.26	-43.72	41.04	47.23

FIGURE ONE
CONSUMER LEVY: ANNUAL WEIGHTED AVERAGE
ACC TO PRODCN & FINANCING OPTIONS

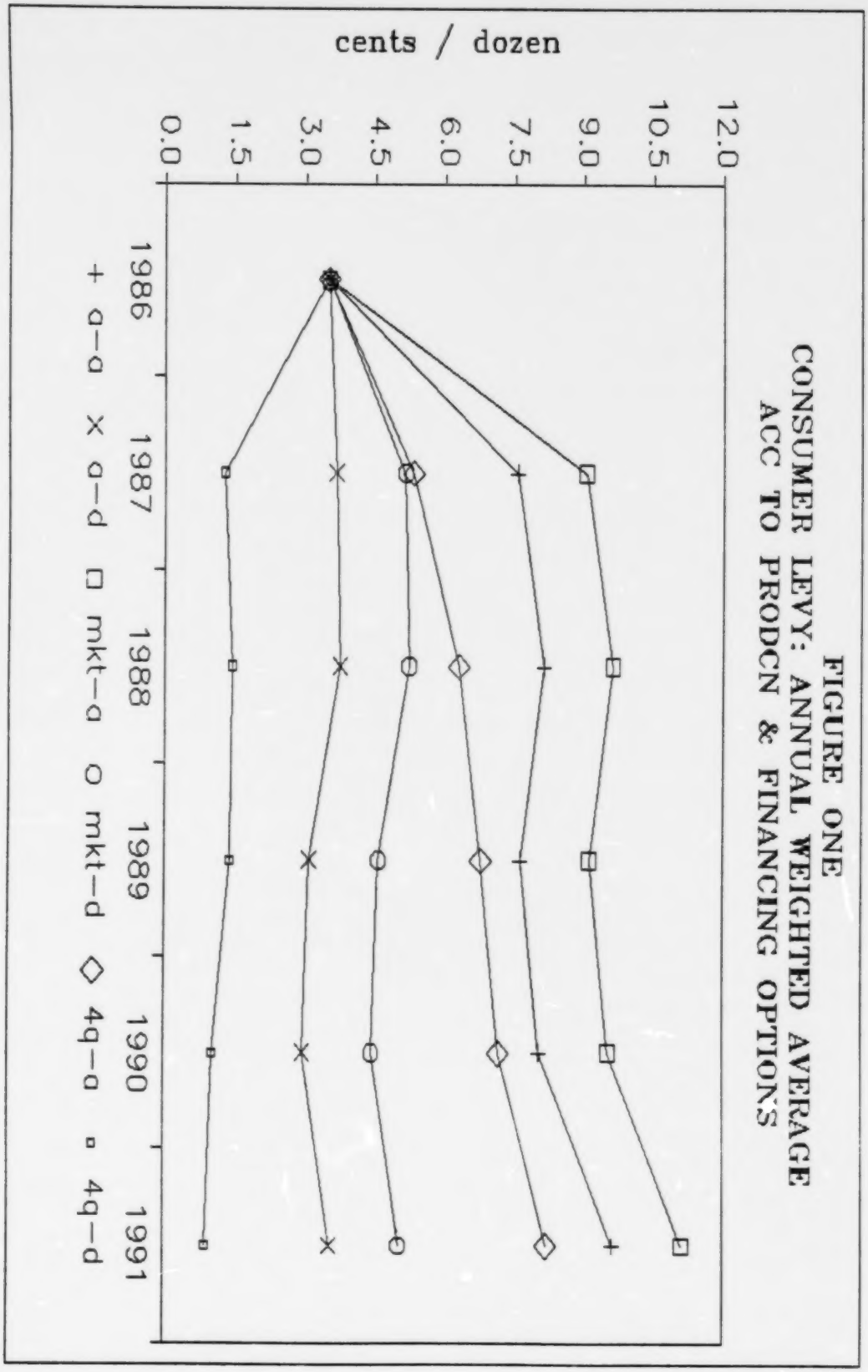
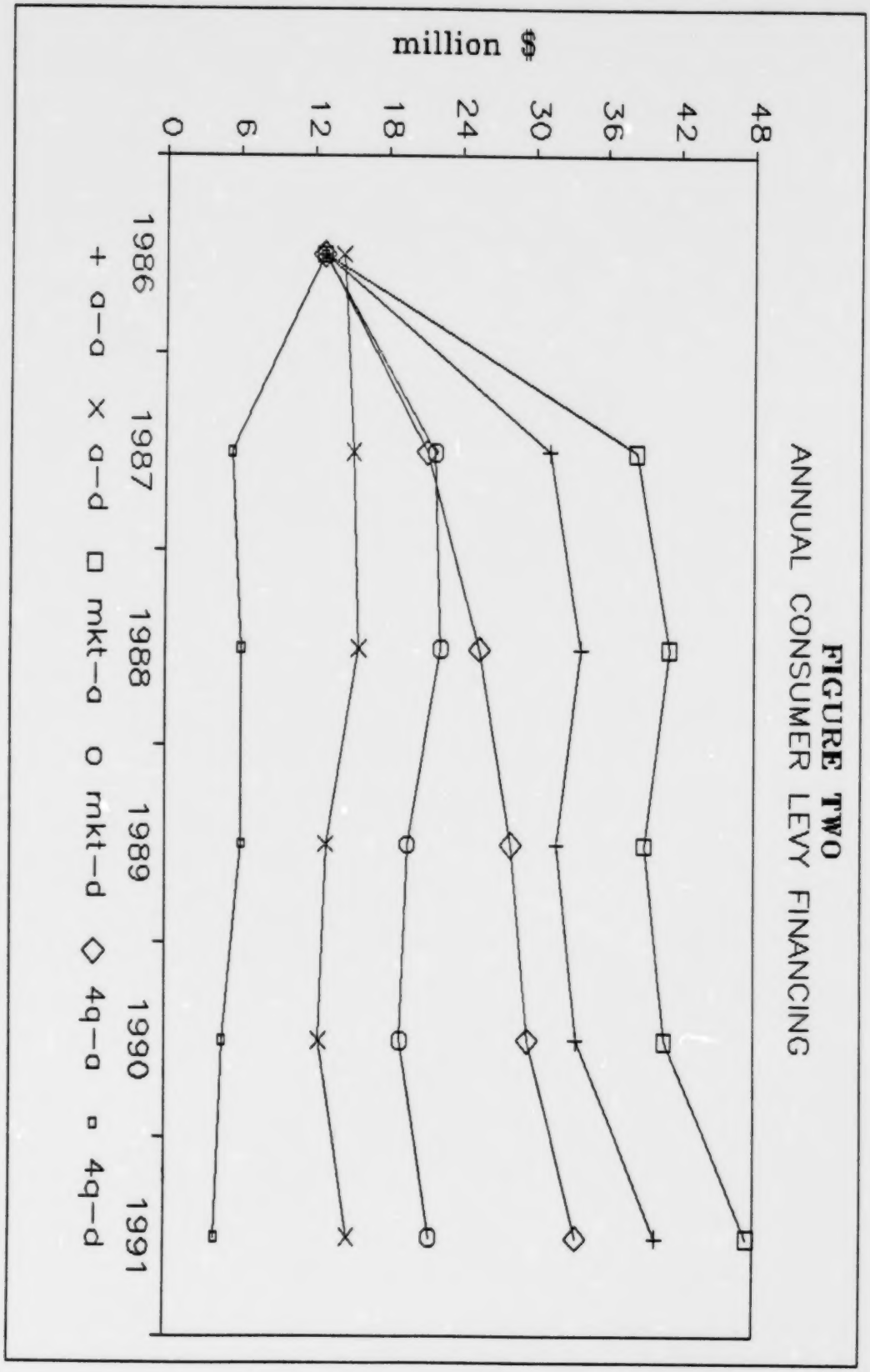


FIGURE TWO

ANNUAL CONSUMER LEVY FINANCING



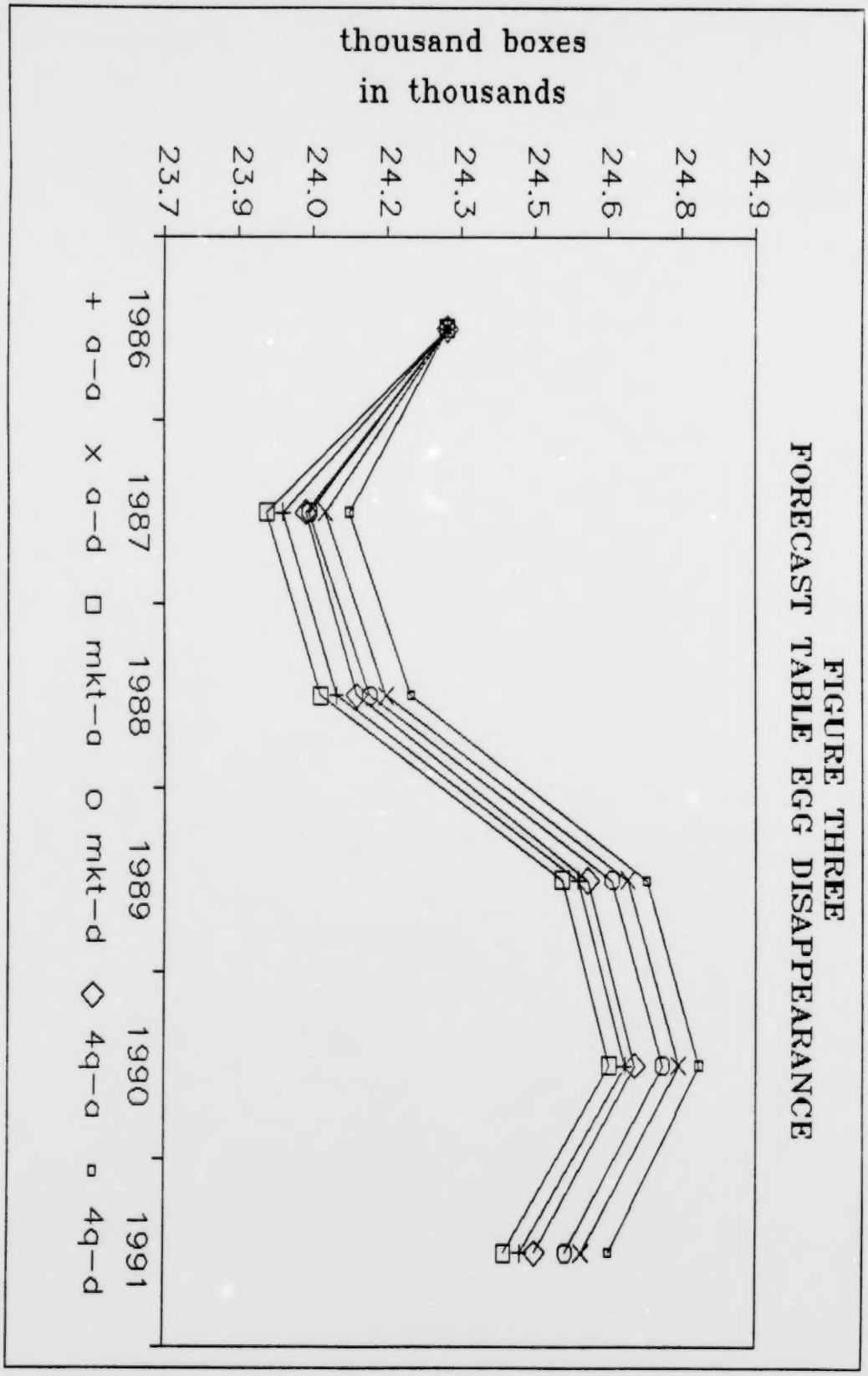


FIGURE THREE
FORECAST TABLE EGG DISAPPEARANCE

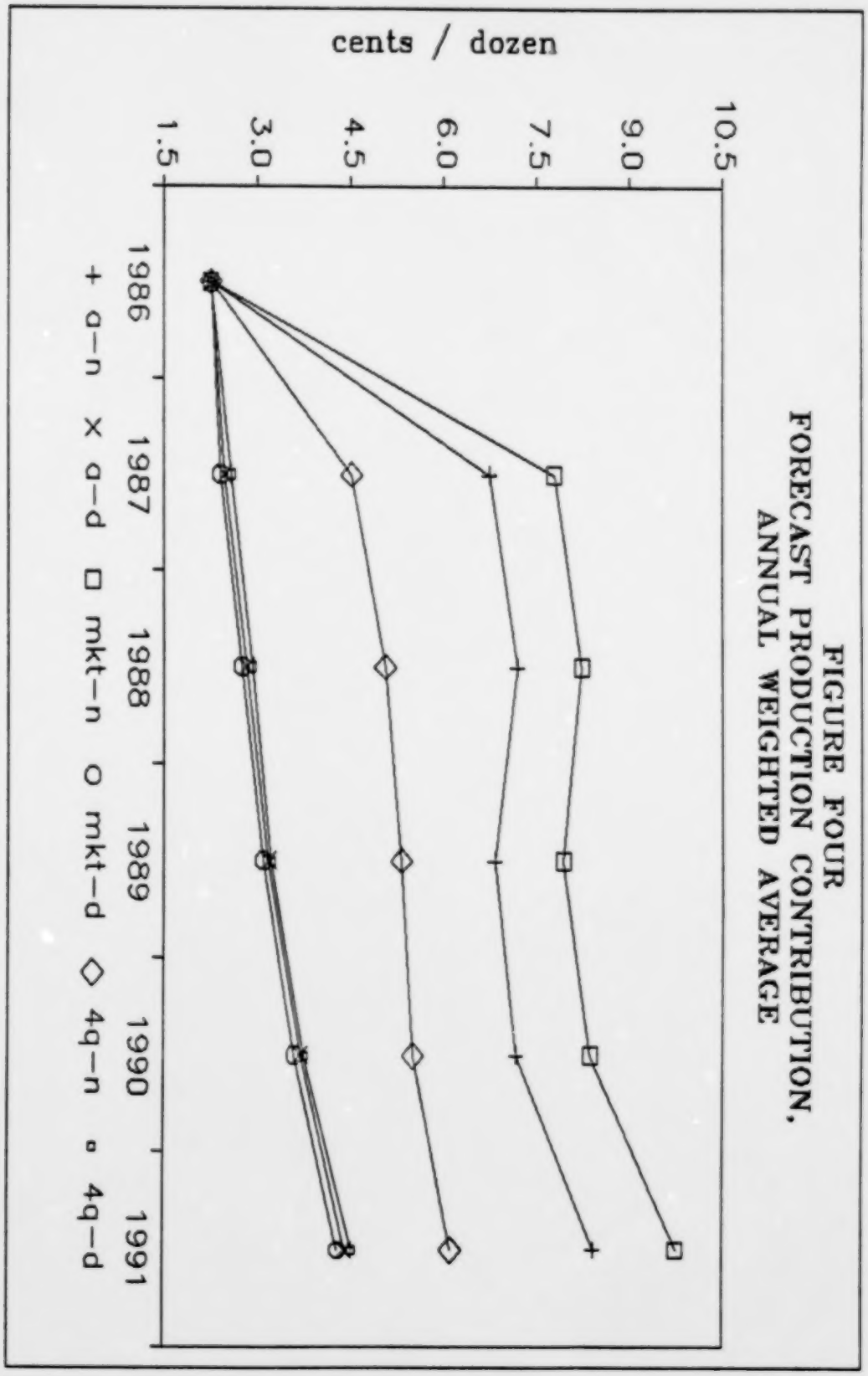


FIGURE FOUR
FORECAST PRODUCTION CONTRIBUTION,
ANNUAL WEIGHTED AVERAGE

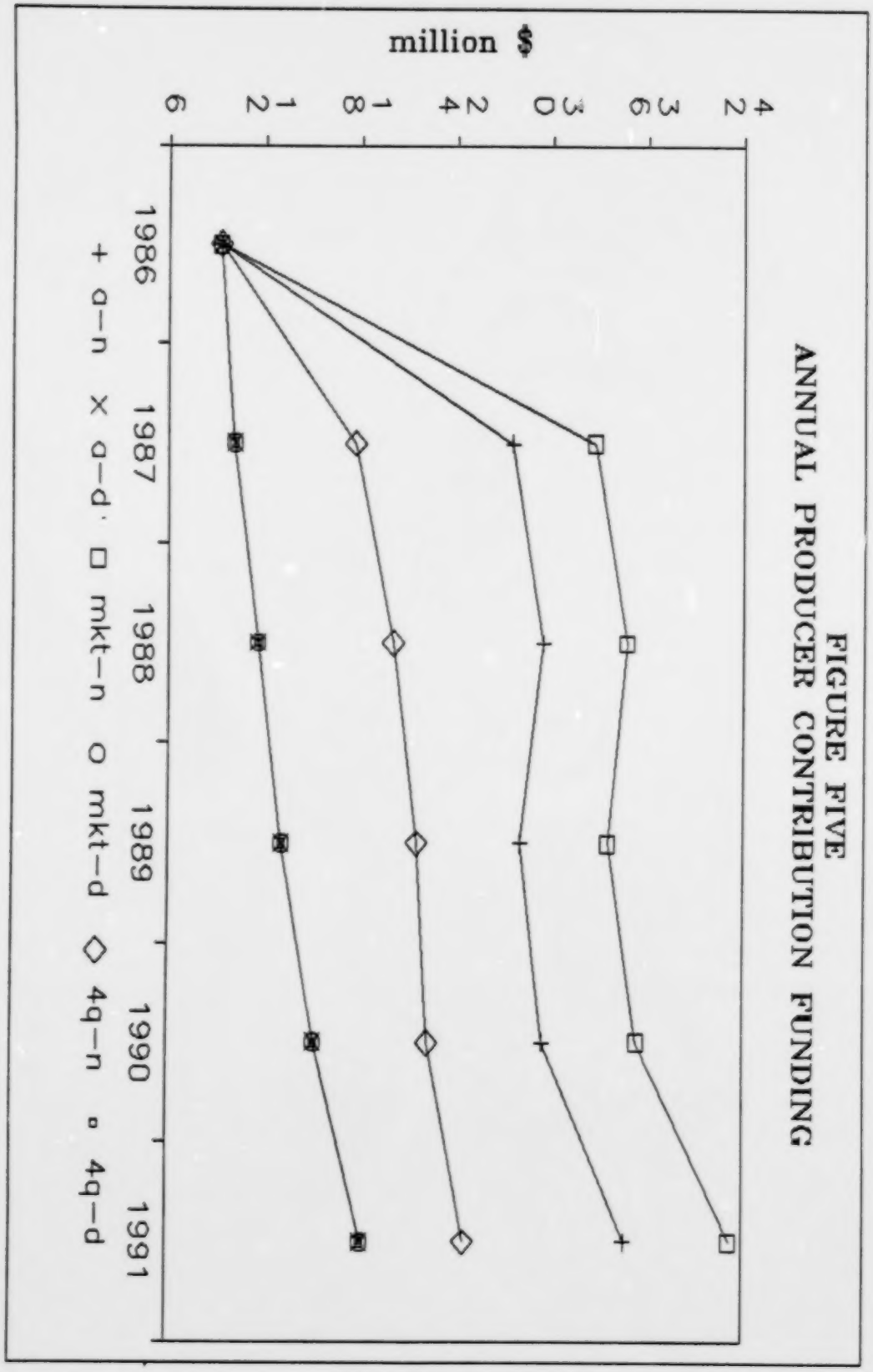


FIGURE FIVE
ANNUAL PRODUCER CONTRIBUTION FUNDING
million $
42
36
30
24
18
12
6
1986
1987
1988
1989
1990
1991
+ a-n × a-d □ mkt-n ○ mkt-d ◇ 4q-n ▫ 4q-d

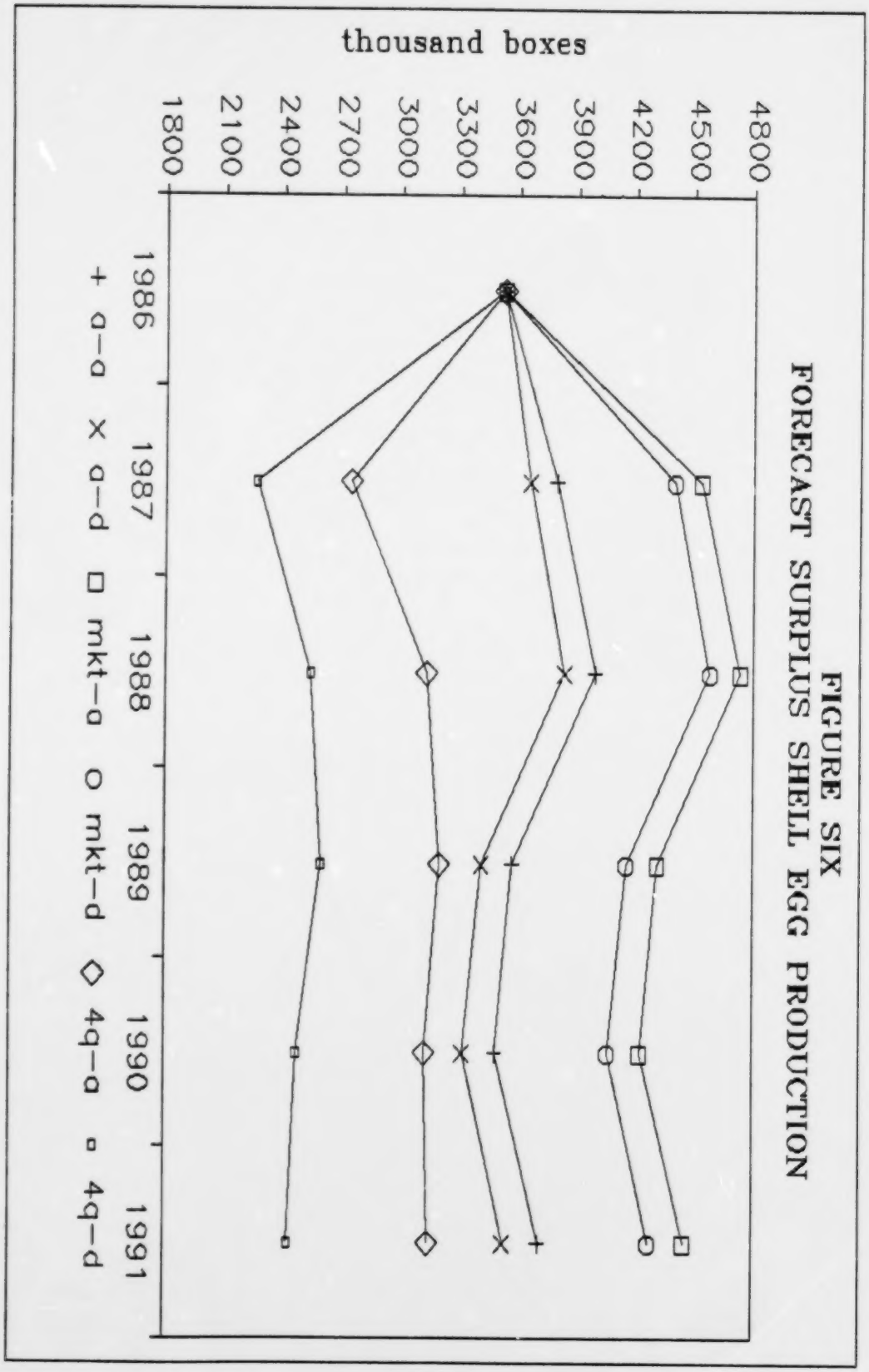


FIGURE SIX
FORECAST SURPLUS SHELL EGG PRODUCTION
thousand boxes
4800
4500
4200
3900
3600
3300
3000
2700
2400
2100
1800
1986
1987
1988
1989
1990
1991
+ a-a
× a-d
□ mkt-a
○ mkt-d
◇ 4q-a
▫ 4q-d

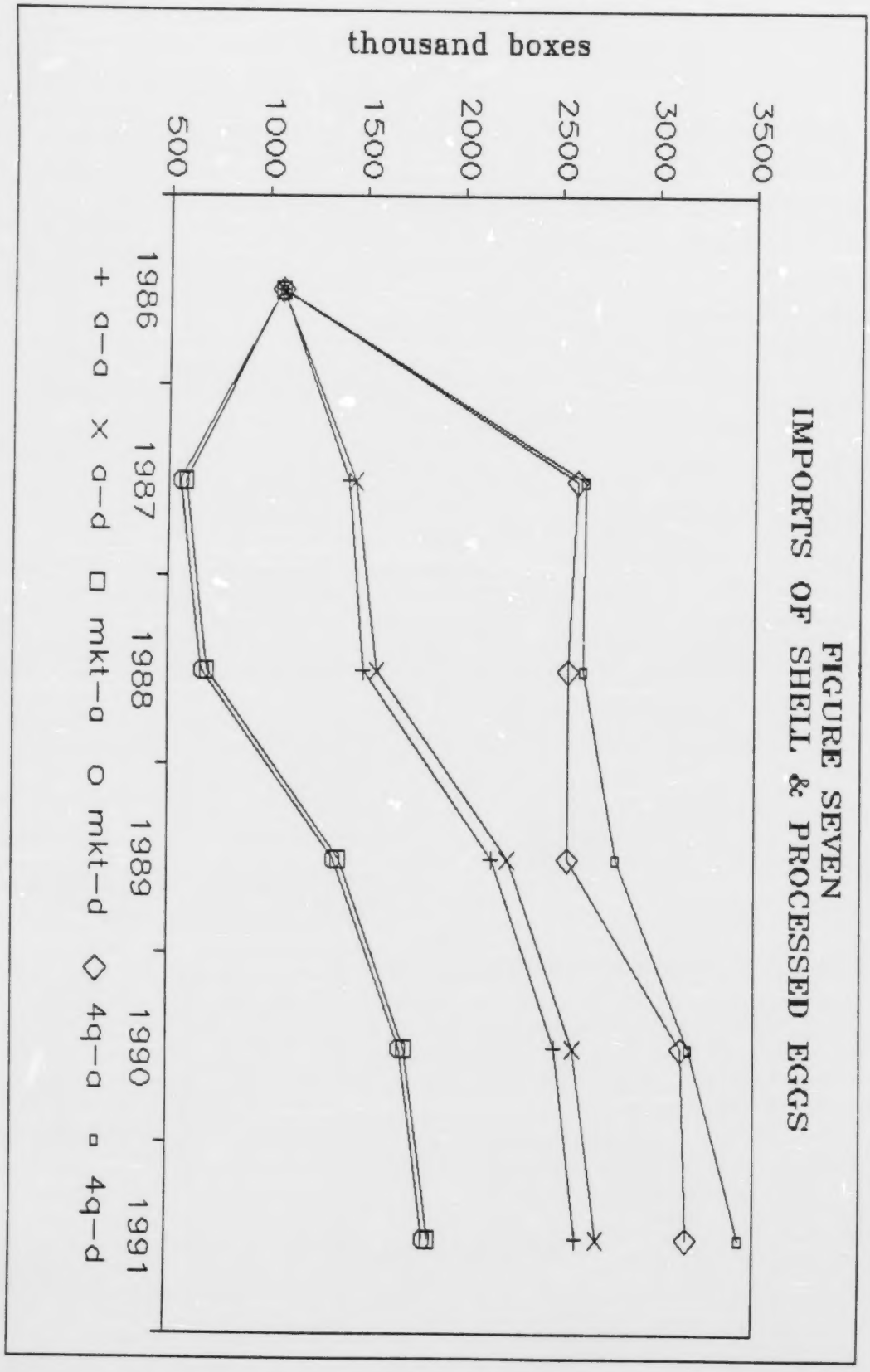


FIGURE SEVEN
IMPORTS OF SHELL & PROCESSED EGGS
thousand boxes
3500
3000
2500
2000
1500
1000
500
1986
1987
1988
1989
1990
1991
+ a-a × a-d □ mkt-a ○ mkt-d ◇ 4q-a ▫ 4q-d

VII. CONCLUSIONS

Section 22, subsection b of the Farm Products Marketing Agencies Act defines the objectives of supply management to include the promotion of the interests of both producers and consumers; subsection a includes the support of a strong and competitive industry. The critical question raised by this study is whether and to what degree these three interests are in fact compatible or opposed, and in what way can the structure of supply management in the Canadian egg industry be designed to simultaneously fulfill these objectives of the legislation.

The legislation directs that the level of domestic shell egg production be set according to the level of domestic table egg consumption. Surplus shell eggs are sold to domestic breakers below the compensatory price, and the costs of surplus disposal are divided among the three sectors of the industry. The difficulty is that increased levels of domestic shell egg production generate increased costs of surplus disposal, which must be distributed in some way among the three industry sectors. Since the appropriate level of domestic production has not yet been clearly defined, the temptation is to set the level of domestic production on the basis of the burden imposed on the consumer sector. In short, this is to define the level of domestic production in terms of a trade-off between the interests of producers and consumers. The role of this study was to precisely determine the values of this trade-off.

This study examined the welfare implications of alternate structures of shell egg supply and surplus disposal financing. This included three alternative levels of domestic production, representing three formulations of an adequate table market supply. The three options regarding the financing of surplus disposal dismissed any contribution from processors, and evaluated only complete support of disposal financing from either consumers or producers, or some fairly even distribution of costs defined in terms of the market of destination of the surplus eggs.

The results of the study appear to be simple and clear. The financial burden on consumers increases as a result of increased domestic production. However, the level of domestic production that corresponds to the greatest possible interpretation of production requirements (fourth-quarter table egg demand plus total average fourth-quarter supplementary shell egg imports) is not expected to impose a significantly increased financial burden on consumers, nor is this maximum level of domestic production forecast to significantly reduce domestic table egg disappearance.

The results of the study suggest that the need for increased support of the growth of the domestic processing industry is virtually immediate.

Table egg consumption has ceased to drop, and processed egg consumption is forecast to rise quickly, both at home and abroad. The shortage of available supplies appears to be forcing domestic processors to choose between satisfying the requirements of either the domestic or the export markets. The results of this study suggest that, given the relatively small proportion of the Canadian egg industry that is accounted for by the processed egg sector, only a relatively small increase in domestic shell egg production could significantly enhance the capability of Canadian shell egg producers to support the growth of of the Canadian processed egg sector in the domestic and international markets.

Appendix A - The Legislative Mandate

The legislative mandate is set out in two documents: the Farm Products Marketing Agencies Act (January 12, 1972), and the Proclamation of the Canadian Egg Marketing Agency (December 15, 1972). Further details of the operation of the Agency are spelled out in the Federal-Provincial Agreement establishing the Comprehensive Marketing Program for the purpose of Regulating the Marketing of Eggs in Canada (final revised agreement, July 29, 1979).

Objects of an Agency

Section 22 of the Act specifies that the objects of an agency are:

(a) to promote a strong, efficient and competitive production and marketing industry for the regulated product or products in relation to which it may exercise its powers; and

(b) to have due regard to the interests of producers and consumers of the regulated product or products.

The powers of the Agency with respect to the imposition of levies are laid out in Section 23 of the Act:

(1) Subject to the proclamation by which it is established and to any subsequent proclamation altering its powers, an Agency may

(a) purchase any regulated product in relation to which it may exercise its powers and any farm product, wherever grown or produced that is of the same kind as the regulated product in relation to which it may exercise its powers, and package, process, store, ship, insure, export or sell or otherwise dispose of any such product purchased by it;

(g) by order, require any persons designated by it who are engaged in the marketing of any regulated product in relation to which it may exercise its powers, or any persons who are so engaged, to deduct from any amount payable by him to any other person engaged in the production or marketing of such regulated product any amount payable to the agency by such other person by way of licence fees, levies or charges provided for in any marketing plan that the agency is authorized to implement and to remit

all amounts so deducted to the agency.

Marketing

The Proclamation defines "marketing" to be: in relation to eggs, (marketing) means selling and offering for sale and buying, pricing, assembling, packing, processing, transporting, storing and reselling, whether in whole or in processed form.

Section 2 (e) of the Act defines "marketing plan": a plan relating to the promotion, regulation and control of the marketing of any regulated product in interprovincial or export trade that includes provision for all or any of the following:

(vi) The imposition and collection by the appropriate agency of levies or charges from persons engaged in the growing or production of the regulated product or the marketing thereof and for such purposes classifying those persons into groups and specifying the levies or charges, if any, payable by the members of each such group.

Levies

The appropriate use of levies is defined in the Proclamation:

10. (1) The Agency may, by order or regulation, impose levies or charges on persons engaged in the production of eggs or the marketing thereof and any such order or regulation may classify such persons into groups and specify the levies or charges, if any, payable by the members of each such group and provide for the manner of collection thereof.

(2) Levies imposed by any order or regulation referred to in subsection (1) shall be established at such levels as to produce in each year a return to the Agency that is an amount sufficient to defray its administrative and marketing expenses and costs as estimated by it, for the year.

(3) The Agency, in estimating its administrative and marketing expenses and costs for a year, shall allow for the creation of reserves, the payment of expenses and losses resulting from the sale or disposal of eggs, equalization or adjustment payments among egg producers based on moneys realized from the sale of eggs during such period or periods of

time as the Agency considers appropriate and any other expenses and costs deemed essential by the Agency for the realization of its objects.

Surplus Disposal

The Federal-Provincial Agreement establishes the responsibility of the Agency for the disposal of surplus shell eggs produced in the course of the routine supply of the table egg market:

The Provincial Commodity Boards and the Minister of Agriculture for Canada do hereby agree that when appointing their representatives to the Agency to instruct them to support the following practices in the Agency policy and the Canadian Egg Marketing Agency on its own behalf agree to carry out the said practices in its policy:

(f) To be responsible for the cost of removing from the shell egg market all eggs in excess of demand that are produced within the provincial allocation of the province, provided the province is in compliance with this Agreement.

Quota System

The initial level of domestic production established when supply management was introduced, and the rule for adjusting the level of production are defined in the Proclamation:

2. (1) The Agency shall, by order or regulation, establish a quota system by which quotas are assigned to all members of classes of egg producers in each province to whom quotas are assigned by the appropriate Board or Commodity Board.

(2) The Agency, in establishing a quota system, shall assign quotas in such manner that the number of dozens of eggs produced in a province and authorized to be marketed in interprovincial and export trade in the year 1973, when taken together with the number of dozens of eggs produced in the province and authorized to be marketed in intraprovincial trade in the same year, pursuant to quotas assigned by the appropriate Board or Commodity Board, and the number of dozens of eggs produced in the province and anticipated to be marketed in the same year, other than as authorized by a quota assigned by the Agency or by the appropriate Board or Commodity Board, will equal the number of dozens of eggs set out in

section 3 of this Plan for the province.

Note: The schedule of provincial quota allocations was based on the average levels of production in the five years immediately proceeding the Proclamation of the Agency.

(3) No order or regulation shall be made pursuant to subsection (1) or (2) unless the Agency in satisfied that the size of the market for eggs has changed significantly.

Pricing

Pricing is defined in the Proclamation:

11. The Agency shall exercise its powers in such a manner as to preclude any person from marketing eggs in a province other than the province in which the eggs are produced at a price that is less than the aggregate of

(a) the price charged at or about the same time for eggs of an equivalent variety, class or grade in the province or other geographical area in which the eggs are produced, and

(b) any reasonable transportation charges therefor to the place where such eggs are marketed and that are incurred by the person marketing the eggs.

And according to the Federal-Provincial Agreement:

(i) The Agency be directed to accept, in the exercise of its power and authority to fix, set, determine or decide all prices the constraints of a cost of production formula which will be monitored by the Council; and free interprovincial trade.

Later the Agency is directed:

(h) To determine or decide the level of prices of eggs in such a way as to provide for a central pricing system which will take into account transportation and marketing differentials.

National Farm Products Marketing Council

Finally, the mandate of the National Farm Products Marketing Council to supervise the Agency is established in the Act:

7. (1) In order to fulfill its duties the Council

(d) Shall review all orders and regulations that are proposed to be made by agencies and that are of a class of orders or regulations to which the Council, by order, provides that this paragraph is applicable and, where it is satisfied that such orders and regulations are necessary for the implementation of the marketing plan that the agency proposing to make the orders or regulations is authorized to implement, the Council shall approve the orders and regulations;

Similarly, the Act requires that the Agency

(f) where it is empowered to implement a marketing plan, make such orders and regulations as it considers necessary in connection therewith, but all such orders and regulations shall, in the case of orders and regulations that are of a class to which paragraph (d) of subsection (1) of section 7 is made applicable, be submitted to the Council before the making thereof, and in any other case, be submitted to the Council either before or after the making thereof and

(ii) any such order or regulation that is submitted to the Council after the making thereof and that is set aside by order of the Council thereupon ceases to be of any force or effect.

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